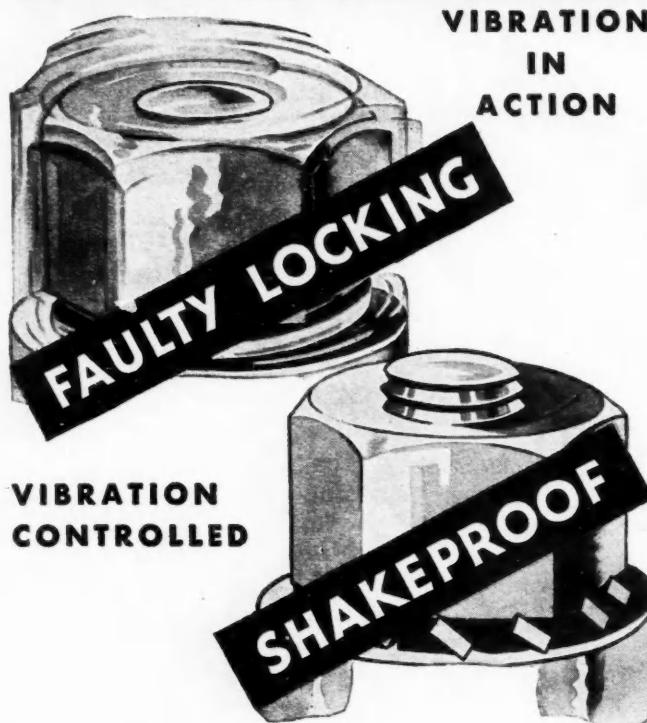


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IN  
ACTION



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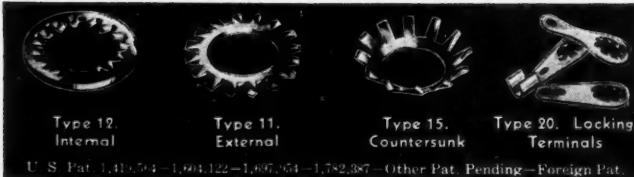
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*(Division of Illinois Tool Works)*

2505 N. Keeler Ave.

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Type 15.  
Countersunk

Type 20.  
Locking  
Terminals

U. S. Pat. 1,416,564—1,604,122—1,697,954—1,782,387—Other Pat. Pending—Foreign Pat.

# AUTOMOTIVE INDUSTRIES

*THE AUTOMOBILE*

Volume 69

Reg. U. S. Pat. Off.

Number 4

JULIAN CHASE, Directing Editor

DON BLANCHARD, Editor  
P. M. HELDT, Engineering Editor JEROME H. FARRIS, Ass't Editor  
JOSEPH GESCHELIN, Eng. Editor ATHEL F. DENHAM, Field Editor  
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J. S. HILDRETH, Vice-Pres. and Director of Sales  
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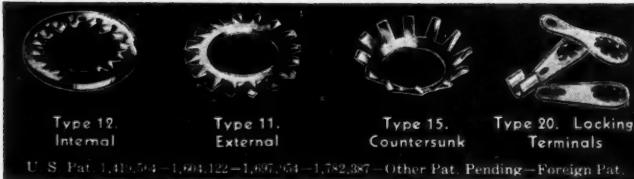
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# AUTOMOTIVE INDUSTRIES

Vol. 69, No. 4

• THIRTY-FIFTH YEAR •

July 22, 1933

## Works Council Plan Won't Work As Negative or Defensive Expedient

"New Deal" ideas essential to success of efforts to establish closer relationships between management and workers—So say many leading executives and the Government

WORKS councils and employee representation plans, relegated to the limbo of forgotten things by a majority of industrialists after being front page news in the days dominated by the World War, have burst into executive conferences again as a result of the National Industrial Recovery Act.

Employers in the automotive and other open shop industries read Section 7 of National Industrial Recovery Act a few weeks ago, began to fear that the way had been opened for unionization of their industries and hesitated to present codes for approval in Washington until such time as they

could understand more clearly the implications of the labor requirements of the Act. Some employers began to look for means of fighting against the provisions even before they had understood them clearly, others proceeded to investigate immediately and others just naturally

got goose-pimpls thinking about the possibilities.

Then two schools of thought, starting from diametrically opposite points of view, began to arrive at the same point—a new interest in works councils confined to individual companies as instruments in development of the labor provisions of the National Industrial Recovery Act.

One type of executive started from the assumption that all collective bargaining is something to be avoided if possible, but that anything would be better than having to bargain with labor unions. Casting about for some means of avoiding the possible necessity of dealing with labor unions, this group recalled the works council and employee representation plans of yesterday and began to investigate this form of organization as a possible "out." So obviously was this the motive behind the attempted formation of new "company unions" in some organizations or industries as to bring forth the blunt comment from Secretary of Labor Perkins that they had been

"Is the Open Shop in Jeopardy?" is the question which L. W. Moffett asked and answered in a timely article which began on page 76 of the July 15th issue. In that discussion, he commented incidently on the position of employee representation plans under the Na-

tional Industrial Recovery Act.

These plans are getting widespread attention in many industries today after years of relative quiescence. In this article, the genesis of the present movement is analyzed; its motives are outlined and its possibilities argued.

formed to evade the provisions of National Industrial Recovery Act. Lady Perkins compared these plans to the war bridegrooms who married in order to escape the draft.

The revival of works council ideas came again into the minds of other industrialists, however, for entirely different reasons. Their thinking has been entirely in harmony with that of General Johnson when he said that "Collective bargaining under adequate Government sanction and supervision should hold no fears for the fair-minded industrialists." Despite generally satisfactory relationships with their employees in past years, this group has taken positive inspiration from the activities of the Administration to provide a new deal for the country. And under the stimulus of that inspiration it has turned to study of employee representation plans as a practical means of building even closer relationships between management and workers.

This latter group, in which can be included more than one important automotive executive, recognizes clearly that no permanent gain is to be achieved through attempted utilization of a works council in any negative or defensive sense. It recognizes that the ultimate success of any works council plan rests entirely on the sincerity of its conception and the intellectual honesty of its administration.

"Yes, there has been a revival of interest in employee representation plans," one executive said the other day, "but too much of the conversation and investigation has been centering around the technical and immediate aspects of the situation.

"It is easy to misinterpret my meaning when I voice the belief that sincerely conceived and administered works councils offer the individual employer his best possible bulwark against unionization of his shops. Obviously, any attempt to talk a group of employees into a 'company union' for the purpose of keeping them out of national labor unions is foredoomed to failure. A works council plan conceived for that purpose is bound to fail—and it ought to fail.

"Where a works council is organized with the sincere intention of providing a better means of handling the common problems of management and workers; of seeing to it that labor gets a square deal—that works council has in it the germs of permanency and full acceptance by employees."

Study of the whole current movement in connection with employee representation plans in relation both to its historic and its immediate background makes plain the fact that the success of any individual plan almost certainly will depend on motives rather than technicalities; on fundamentals rather than on details.

The average group of employees today will not long be fooled as to the motives behind a works council



plan proposal. If the motive is sincere, the plan has good chances of being accepted. If the motive is insincere, the employees probably won't join, because they will be backed by governmental authority in their right to choose for themselves as regards such affiliations.

A works council plan conceived in a sincere desire to work out more adequately a new deal for employees, on the other hand, is likely to meet with support today—just as at any time in the past. When individual employees are enthusiastic participants in a works council plan, automatically they will be less favorable to approaches from general union sources.

Enthusiastic participation by employees in a works council plan,

in other words, is the best insurance possible against organization of a plant by a general union. *But that enthusiastic participation cannot be hoped for or obtained if the works council is set up for the purpose of discouraging employees from joining a general union.*

There is every indication that works council plans which have been functioning successfully for a number of years will be undisturbed by the functioning of NIRA. From sources close to the administration in Washington come indications that the matter of collective bargaining in individual plants is to be left entirely to the workers in that plant. If the workers are agreeable to bargaining collectively through company unions they have the right to do so. Section 7 of NIRA requires that employees shall have the right of organization and collective bargaining and that no employee shall be required as a condition of employment to join a company union or refrain from joining a labor organization. In other words, the employee can join a company union if he wants to, or he can join an organized labor union if he wants to. The choice is his own to make.

Despite their absence from newspaper headlines, works councils and employee representation plans have continued to function steadily and successfully in many plants through good times and bad. The number of workers covered by employee representation systems in the United States increased, as a matter of fact, from 403,765 in 1919 to 1,263,194 in 1932.

The number of firms having such systems in effect decreased from a peak of 426 in 1926 to 313 in 1932, a decline of 28 per cent. The number of employees covered by such systems, however, fell only 8 per cent in this period—from 1,369,078 to 1,263,194.

Commenting on these figures for which one of its recent surveys is responsible, the National Industrial Conference Board says:

"With general industrial employment declining about 40 per cent between 1926 and 1932, while the number of employees covered by employee representation systems was declining only 8 per cent, these systems would appear without question to have held their ground.

"It is significant," the report adds, "that over 85 per cent of the employee representation systems found to exist in 1932 had been in continuous operation for more than 10 years."

# JUST AMONG OURSELVES

## Dumb or Not So Dumb—

THE more years one spends in work involving transmission of ideas the more one senses the paucity of all forms of communication. Words and pictures, literature and art, speech and gesture—only a master of all can hope to convey information, let alone emotion, with reasonable accuracy. Every experienced advertising man must have been struck by this truism many times.

The average man fails frequently to recognize the constantly present dangers of inaccurate or incomplete expression. Much of the sand in the wheels of business consists of nothing but the failure of a given set of communication signs to convey to the particular listener or reader the concepts actually in the mind of the sender.

Belatedly reading Somerset Maugham's famous "Moon and Sixpence," we were struck with one passage which expressed these difficulties pungently. "Each one of us," Maugham wrote, "is alone in the world. He is shut in a tower of brass and can communicate with his fellows only by signs, and the signs have no common value, so that their sense is vague and uncertain. We seek pitifully to convey to others the treasures of our heart, but they have not the power to accept them, and so we go lonely, side by side but not together, unable to know our fellows and unknown by them."

"We are like people living in a country whose language they know so little that, with all man-

ner of beautiful and profound things to say, they are condemned to the banalities of the conversation manual . . ."

Perhaps it isn't as bad as all that—and perhaps everybody hasn't beautiful and profound things to say—but we might all be surprised with what actually is in each other if more adequate communication were possible.

\* \* \*

## And They Expect—

THE idea that automobile prices may be on their way up is beginning to permeate the thinking of the general public, we believe. Traveling about among a number of different social groups during a week's holiday we heard at least six different people express the conviction that now is a good time to buy cars—before the prices go up.

We don't pretend that six out of 125,000,000 expressions constitute a survey, but think the remarks worthy of mention because they were the first of their kind we have heard in several years. The public undoubtedly is getting into a frame of mind to accept as natural reasonable increases in car prices. The only thing that could shatter that trend in public thinking would be price reductions as a part of clean-ups preparatory to new models.

Although we have long opposed inside trading discounts as basically unsound practice, we are inclined to hope that they will be used or continued in lieu

of actual price reductions should any extensive clean-ups be necessary this fall. It is pleasing to report, however, that the signs now point to very minor cleanup problems in a vast majority of lines this year.

\* \* \*

## A 10 to 1 Shot

HERE'S one gleaned from some recent publicity from G.M. of Canada, (which company we are constrained to remark sends out publicity material which interests us more regularly than other routine releases):

"An arm protruding from the side of the car ahead, according to the *Montreal Star*, can signify any one of the following things: The motorist is (1) knocking ashes off his cigarette; (2) going to turn to the left; (3) warning a small boy to shut up; (4) going to turn to the right; (5) pointing to the scenery; (6) going to back up; (7) feeling for rain; (8) telling his wife he is sure the front door is locked; (9) hailing a friend in a passing car; (10) going to stop."

\* \* \*

## Fear Copy Sells, But—

EVERY time we see "fear" copy used in automotive advertising we wonder again if it isn't bad business in the long run.

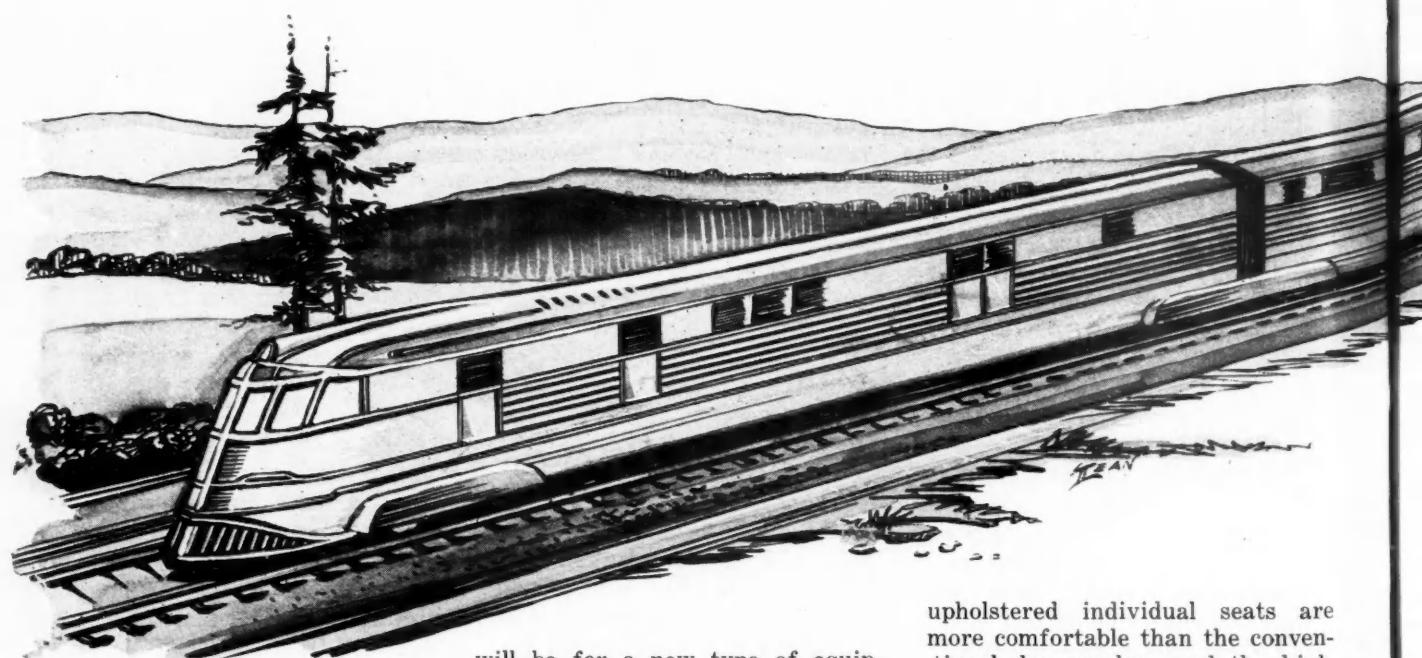
Designed to scare people into giving more maintenance care to their cars, such copy undoubtedly makes some people resolve to drive their automobiles as little as possible—or not to drive at all.

"Fear" copy has plenty of disadvantages even when it is absolutely true; when it trifles with facts, of course, it is even worse.—N.G.S.

# Will Rail Cars Win Back Lost Passengers?

by P. M. Heldt

Engineering Editor, *Automotive Industries*



**A**MERICAN railroads evidently have reached a critical stage of their development. Passenger traffic has declined from more than a billion a year during the middle twenties to less than a half billion during the past year, and it is generally recognized that drastic steps are necessary to regain a substantial part of this loss. Of course, the decrease is due in part to the depression, but the fact that competing services have experienced no comparable loss and that one of these, air transport, has enjoyed an actual gain, indicates that railroad passenger traffic is not likely to grow on a scale commensurate with the recovery of business generally now that we have turned the corner, unless improved service is rendered by the railroads at reduced fares. During the past few years of low traffic very little equipment has been bought by the railroads, so that when traffic increases again the demand for new equipment is likely to be quite brisk, and indications are that the demand

will be for a new type of equipment that will enable the railroads to offer speedier transportation, with more frequent services, at reduced fares.

The severe drop in traffic and revenues has led many railroad officials to take stock of the situation. They realize that they have lost a great deal of traffic to the private automobile and to the bus, and some to the transport plane. Competition of air lines today is a very small factor, but railroad officials remember that the use of private automobiles and buses also started on a small scale. The use of private automobiles for long distance travel is a matter of convenience for the most part. His own car takes the traveler from door to door, he eliminates the bother of making connections, and when he gets to his destination he has his car with him for use in making local trips. This convenience factor of course is something the railroads cannot hope to equal.

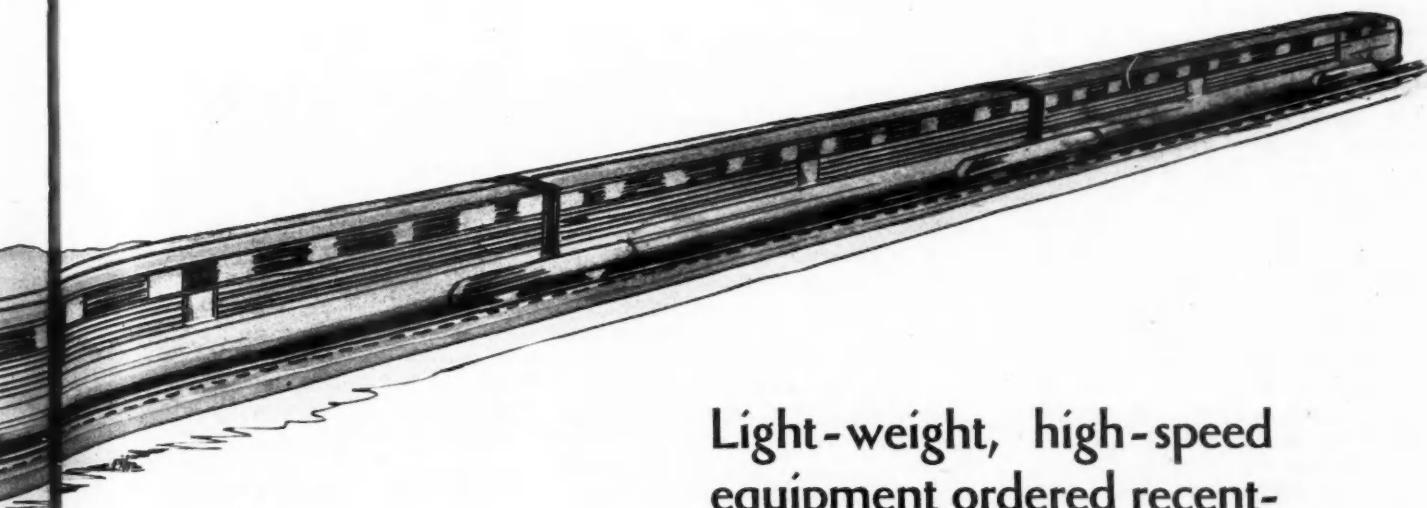
In the case of the motor bus the chief factor which has drawn traffic away from the railroads is greater economy. Buses with their deeply

upholstered individual seats are more comfortable than the conventional day coaches, and the highways possess certain scenic advantages over the railroads. Moreover, the bus being a much smaller unit than the train, a more frequent service can be offered. While all of these factors counted in throwing traffic to the bus lines, the main basis of competition between bus lines and railroads is the fare.

The chief advantage of air transport is its speed. It is in recognition of this fact that the principal air lines are now installing planes with cruising speeds of over 150 m.p.h. There are no doubt other factors which draw traffic to the air services, such as the novelty of the experience and the thrill of an air trip, but these, of course, will soon lose their potency.

The railroads feel that the service they offer has one advantage over that of any other means of transportation, in that in a railroad train the passenger is not "ride conscious." The passenger in a modern train can relax completely and enjoy the view or conversation with his fellow passengers. If he is not looking out of the window he is almost completely unconscious of

# lost Passenger Traffic?



the fact that he is moving, which adds to the restfulness and enjoyment of travel.

Most railroad executives today are convinced that in order to regain some of the traffic which they have lost to other systems of transportation they must increase the speed, lower the cost and provide more frequent service. If, in addition, they can offer greater comforts, that, too, will be a help.

The situation calls for a revolution in railroad practice, and indications are that the principal feature of this revolution will be a change from steam to internal combustion motive power for a substantial part of passenger service. It was the internal combustion engine which made possible effective competition with the railroads on the public highways and in the air, and now the railroads will seek to meet this competition by adopting the internal combustion engine themselves.

The use of internal combustion equipment on railroad lines started in a very modest way nearly twenty years ago when motor trucks were converted for use on rail lines by equipping them with flanged wheels and suitable bodies. From this developed the railcar which has had its principal use on branch lines with insufficient traffic for steam trains. A concurrent development was that of the internal combustion locomotive which is used chiefly for switching work, where it has shown great economy over

**Light-weight, high-speed equipment ordered recently indicates rail executives see broader field of usefulness for rail cars in recouping losses in passenger business**

the steam locomotive. Railcars have increased in size continuously until now many of them carry engines of 400-500 hp. From branch lines with very small traffic they have come into use also on suburban lines on which there is usually very heavy traffic during rush hours in the morning and evening but comparatively light traffic during the rest of the day. Because of the relatively light traffic during non-rush hours, trains were few and far between, and this tended to divert the non-commuting traffic to other means of transportation.

The gas-electric railcar has proved quite a boon to the railroads in this field. The per-mile cost of a railcar with trailer is very much less than the equivalent cost of a steam train with perhaps two coaches. When the traffic is very light the railcar can be run alone, whereas with steam the smallest serviceable unit consists of the combination of a locomotive, tender and coach. Thus a more frequent ser-

vice is possible with railcars. Besides, with the powerful engines now fitted, the acceleration of the railcar is materially greater than that of the steam train, and better schedules can be maintained than with steam when frequent stops have to be made.

The latest field to be invaded by the internal-combustion engine is that of main-line passenger service, and this, of course, holds out far greater opportunities than the lines of railroad work to which it has been confined in the past. In this service higher speed, more frequent trains, and greater comfort are of importance. Trains, of course, are likely to be shorter than in the past and this, of course, tends to make increased speeds possible. Generally the factors which make for increased speed are increased power, streamlining of trains, and reduced weight.

Up to now the majority of railcars have been equipped with gasoline engines, but the prospects are

that in the future Diesel engines will take their place more and more. The railroads have to pay the same state and Federal taxes as automobile owners on gasoline. Determined efforts have been made by them to relieve themselves of these taxes, but the Supreme Court recently handed down a decision in the case of the Seaboard Air Line holding that states have the power to tax gasoline even if it is used for interstate transportation. The amount of taxes involved in this suit was \$658,000. With gasoline subjected to an average tax of perhaps five cents per gallon, the cost for fuel can be cut about 75 per cent if oil engines are used instead of gasoline engines. In addition, the greatly reduced fire hazards are an important consideration.

The internal combustion-electric train being a relatively new development in this country, no suitable engines of either the gasoline or Diesel types were in existence here until quite recently. Engines with a continuous output of close to 1,000 hp. are required, and they must be of the high-speed type, as otherwise their weights would be excessive. There naturally was little incentive to undertake the necessarily expensive development work during the past two years when railroad traffic decreased incessantly and business in general was stagnant, but now that the railroads are beginning to buy new equipment and show a definite leaning toward the internal combustion system we may expect to see considerable development in this line.

### Streamlining of Trains

Streamlining, of course, is vital in all high-speed work. It has long been customary to make model tests of ships in experimental tanks and of airplanes and airplane elements in wind tunnels. Wind tunnel tests of passenger cars are of comparatively recent origin, and so is the application of this method of testing to railway rolling stock. It is, of course, impossible to achieve perfect streamlines in a railroad car or a railroad train, but much can be done to reduce air resistance, and all of the high-speed railcars and trains which have been called to public attention recently show commendable efforts to cut down this source of power loss.

Perhaps even more important than a reduction of air resistance is a reduction in the weight of rolling stock. Railroad equipment always has been exceedingly heavy, judged

by automotive standards. When car-builders' practices first became crystallized, some fifty years ago, the materials of construction available were relatively poor. This made it necessary to build heavy, and the tradition then established has been adhered to ever since.

### Light Construction

In the meantime the development of the automobile, and even more that of aircraft, has shown what can be done in the way of combining lightness with strength when superior materials are available and this object is kept always in view. The modern car builder who wants to build light equipment for high speed services has two materials from which to choose, viz., alloy steel and alloyed aluminum. Rolled shapes of aluminum alloy have been available now for some years, and the Aluminum Company of America, which is making these shapes, had the railroad field specially in view when installing equipment to produce the material. Aluminum is available also in tube and sheet form so that cars can be built completely of this material. Aluminum is largely used in railroad high-speed cars built by the J. G. Brill Company and the Pullman Company.

The E. G. Budd Company has introduced stainless steel as a material of construction for railroad cars. This steel can be given a high tensile strength (150,000-180,000 lb. per sq. in.) by cold working. It can also be welded electrically but unfortunately, after the physical properties have been raised by cold working the material must not be heated above a certain critical temperature or the improvement effected by the cold working is lost again. The Budd company has developed a new method known as shot welding by which the heat is applied so rapidly that the surface is brought up to welding heat and cooled again before the molecular transformation which results in the reduction in tensile strength can take place. By this system the frame members are built of rolled strip of which none is more than 0.040 in. in thickness. A three-car train now under construction at the Budd plant for the C. B. & Q. Railroad will weigh only 80 tons, as compared with 200-400 tons for steam trains of equal capacity. This train will be equipped with a two-cycle Diesel engine developing a maximum of 650 hp., of which about 50 hp. will be required for

driving auxiliaries, leaving 600 hp. for train propulsion. Maximum speeds approaching 100 m.p.h. are figured with.

Another feature in modern railroad equipment and embodied in the Budd three-car train, which makes for weight reduction, is the so-called articulated construction. By this the adjacent ends of two cars are supported on a single truck. Each car is provided with a bracket which terminates in a segment of a hollow sphere. There is a similar segment or pan on the truck, and the various segments or pans are fitted one into another and the whole is held together by a king bolt. By using a single truck for supporting one end of two cars, a considerable amount of weight can be saved. The framework of the trucks for the Burlington train are also of stainless-steel, shot-welded construction.

### Three-Car Trains

It is indicative of the space and weight economy of internal combustion power units that several three-car trains now being built have no separate locomotive. In the Burlington train the powerplant occupies only a part of the leading car, which also provides room for a railway postoffice and a baggage compartment. No passengers are carried in this car, but the second car is given over entirely to passenger accommodations and the third car, in addition to a passenger compartment, has a small buffet.

Another new feature that has been introduced into railway practice during the past year is the use of pneumatic tires. This practice, sponsored by Michelin, the French tire manufacturer, will probably be limited to the lighter rolling stock. It naturally goes well together with systems of light construction, such as that involving the use of stainless steel and shot-welding, and the rights to the Michelin construction in this country are controlled by the Edward G. Budd Manufacturing Company. The company has under construction for the Texas and Pacific Railroad a two-car train consisting of one motor car and one trailer car. The latter is mounted on sixteen pneumatic tires, but the former runs on iron tires because of its greater weight. Since this car has neither motive power nor metallic contact with the wheels, it is thought that it will be the most quiet railroad car ever produced.

In designing pneumatically tired  
(Turn to page 102, please)

# Payne Magnetic Clutch Has Radial Grooves in Driven Disk

A MAGNETIC clutch for both industrial and automotive uses has been developed by C. Q. Payne of New York. Mr. Payne believes that the high torque/weight ratio, the simple design, and the fact that no delicate adjustments are required to take up wear on the clutch faces, make the clutch particularly adapted for use on passenger cars, trucks and buses. A transmission embodying this clutch, in which speed changes can be made either automatically or by hand, is now in preparation, and it is hoped to present a description of this transmission in a later issue.

As shown in the sectional view reproduced herewith (Fig. 1), the electro-magnet and its armature form the driving member, and a driven disk of magnetic material is located between them. The armature has a splined driving connection with the inside of a driving drum which surrounds the magnet, and it is therefore able to move axially with relation to the magnet a small distance. When the circuit of the electro-magnet is opened and the clutch therefore disengaged, a spring plate withdraws the armature from the electro-magnet, freeing the driven disk.

The insulated collector rings are shown in Fig. 1 attached to a bracket bolted to the end of the clutch. Ordinarily two brushes are used for each ring, bolted to an annular ring of Bakelite and so mounted that the pressures of the two pairs of brushes balance each other, allowing them to float on the collector rings. When used in connection with an automobile transmission, only one collector ring is needed for each member of the double clutch used for such installations, as one lead of each magnetizing coil is then grounded.

The photographic illustrations reproduced herewith, Figs. 2 and 3, show the faces of the armature and driven disk respectively. The particular feature of the Payne clutch is that these members are grooved radially. The armature has

60 grooves, and the driven disk, 30 of the same size on each side. The polar faces of the clutch are also provided with 60 grooves, which register with those on the armature plate when assembled. Loss of metal due to the grooves in the clutch faces is compensated for by making the combined pole face areas of the clutch about twice that of the cross sectional area of the core of the electro-magnet. In the armature plate there is an ungrooved pressure area of bronze between the pole faces, which helps further to distribute the pressure exerted by the electro-magnet when the clutch is engaged. A similar pressure ring is provided between the pole faces of the electro-magnet. Distributing the pressure over a greater area than the "torque areas" is intended to increase the durability of the clutch faces. A clutch with a diameter of 8 in. across the pole face has a net weight of 34 lb. and its mean static pull-out torque is said to be 340 lb.

With current from a 6-volt battery between  $2\frac{1}{2}$  and 3 amperes is required to develop full torque, while during gradual engagement only one half of this current is required.

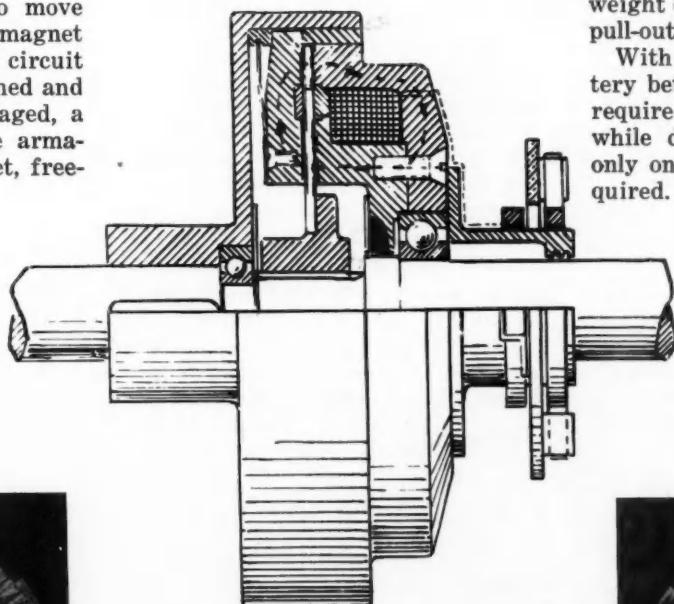


Fig. 1—Assembly drawing of Payne magnetic clutch, showing magnetic circuit

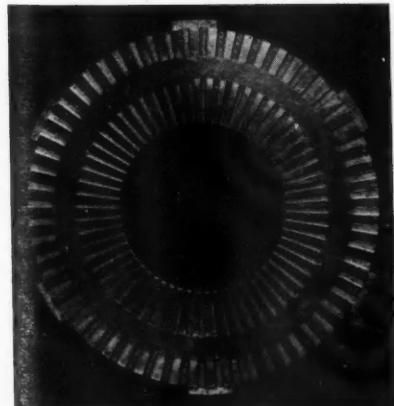


Fig. 2—Face of armature of magnetic clutch with ungrooved central pressure area of bronze



Fig. 3—Driven disk of clutch with radial grooves in its face

# The FORUM

*Editor, AUTOMOTIVE INDUSTRIES:*

Having just returned from Europe after four months' absence, I naturally read up all the issues of *Automotive Industries*, which I had missed. And, lo, and behold, on page 285 in the "Forum" I ran across the contribution by Mr. A. P. Steensen, calling engineers' attention to the overlooked possibilities of the steam driven automobile.

I read it with an amused chuckle, but then thought: This important question deserves an airing in the "Forum," and you can speak with

## Steam Engines Need No "Crutches"

a certain amount of authority, having been the designer of several outstanding gas cars and also, for five years, chief engineer of the Stanley Motor Carriage Co.

I quite agree with Mr. Steensen that too much ingenuity has been wasted on such things as automatic gear shifting, hydraulic and elec-

tric transmissions and all the numerous refinements to prop up an inherently weak design. A few days ago I inspected the latest passenger automobiles and the question shot through my head: Has it ever occurred to these engineers that they are a splendid example of the man in Elbert Hubbard's story, who was running around in a circle pursuing the horizon. Somebody called out to him: "You can never . . ." "You lie," he cried, and ran on. Or are these men designers in the sense of a Parisian modiste? Why don't they ever step back from the picture and analyze the situation in its broad aspects? Ask themselves: "What is it all about? Aren't we following the same rut slavishly for 30 years and aren't we getting into it deeper and deeper every year? What are we trying to accomplish? "Transport people economically with a certain standard of comfort in accordance with the price of the vehicle." But why do we have to do it with the most unsuitable type of prime mover, the internal combustion engine? Why not get down to fundamentals and consider the oldest type once more—steam? It certainly meets the requirements of a vehicle in an ideal way, and it has the tremendous advantage of simplicity.

Let us remember that the internal combustion engine is by nature a constant speed engine whose power output goes up and down with the speed. It has no torque whatever, standing still, and even needs an electric motor to get it going, whereas the steam engine has its maximum torque at zero speed, exactly what you need for a vehicle. Putting it bluntly, the internal combustion engine can be used for a

## Lubrication and Temperature Control

*Editor, AUTOMOTIVE INDUSTRIES:*

Relative to the symposium on page 670 et seq. in your issue of June 3rd, your readers are doubtless aware that cooling of main bearings of large engines has been successfully carried out by one of the leading Italian engine makers of aircraft engines. Probably others have adopted this method of drawing away heat from an important zone by forcing a coolant through the main surrounding structure. We have known for a long time that the actual surface temperatures of the bearing and journal are much higher than that of the oil leaving the bearing—this is simple logic. The reason that bearings of modern engines stand up to the higher duties now possible is because the bearings are better.

Some years ago I was called upon to design an aircraft engine which would be in suitable condition, thermally, to take off in a few minutes from the time of starting up instead of requiring fifteen to thirty minutes run for

warming up the engine and the oil system as was then the prevailing practice. One of the expedients which I adopted was to divide the oil system into primary and secondary, the former being of small capacity, about three-quarters of a gallon, and having a closed circulation. In about two minutes this engine was in reasonable condition for flight, the small volume of oil circulated being partly responsible for the possibility. The main oil supply acted as a supplementary feed and the system is subject matter of a patent which I applied for about 1926. Several engines of this type were made in Philadelphia and subsequent engines have been made by me on a modified system of the same general character, and have proven quite satisfactory in oil temperature control.

Limitation of temperature range is of maximum importance with a material having such wide viscosity characteristics as oil.

Yours very truly,  
ROBERT W. A. BREWER.

vehicle only by making it walk on crutches, so to speak, and, God knows, we have made more crutches for it every year, starting with the time-honored clutch and transmission.

Then, in the course of time, came the electric starting motor, the oil filter, the oil cooler, the vibration-dampener on the crankshaft, the vibration-dampener in the clutch, the synchromeshing of gears, free wheeling and now we even have added a small apparatus which chokes the carburetor automatically, and one which forever keeps on starting the motor, should it die while free wheeling. Not to say anything of the multiplicity of cylinders, pistons, rings, valves, valve lifters, and ignition parts which require service at definite intervals. Every year or two all the cylinders have to be reground and new pistons and piston rings fitted to keep the motor from oil pumping. Compare this to the steam engine with only two or three cylinders, whose pistons and rings never need replacing, whose two or three valves never need regrinding or adjusting.

\*But, my dear Mr. Steensen, try to arouse the interest of a manufacturer of conventional cars or buses in steam and you are sure of a very cool reception: "Yes, I know all about it" (which is not true), "but we could not think of it. All

equipped and jiggled up to manufacture our Model 647. Sorry . . ." That's the stereotyped answer you will get.

And the other road, that of organizing a new company? A man would have to be the "rara avis" of a combination of a capable engineer and a promoter. Otherwise, he is bound to be manhandled and trimmed by the promoters. The writer had sufficient confidence in steam vehicles to put his own meager funds into a company he had founded in 1930, but could not stand the financial strain alone for more than three-

quarters of a year.

So, Mr. Steensen, I quite agree with you when you state that it should be possible to combine performance, economy, simplicity of control and relative simplicity of mechanism. As a matter of fact, I have succeeded in doing this very thing, but who is going to finance it? That is the question. Let's hear from other engineers!

E. H. DELLING.

\*May I also point out Mr. Hewitt's complaint in a later issue, on page 436, that "on his car he wants 90 per cent less gadgets which do go wrong and cost time, money and trouble for servicing'?

## New Lubricant Testing Machine

*Editor, AUTOMOTIVE INDUSTRIES:*

Your articles on oiliness of lubricants have been of great interest to me, because during the past few years I have been doing research work along this line at the University of Arizona.

The machines on the market for testing the oiliness property of lubricants seem to me to have objections in one way or another, the main objection being the lack of adaptability of the machine for general commercial application.

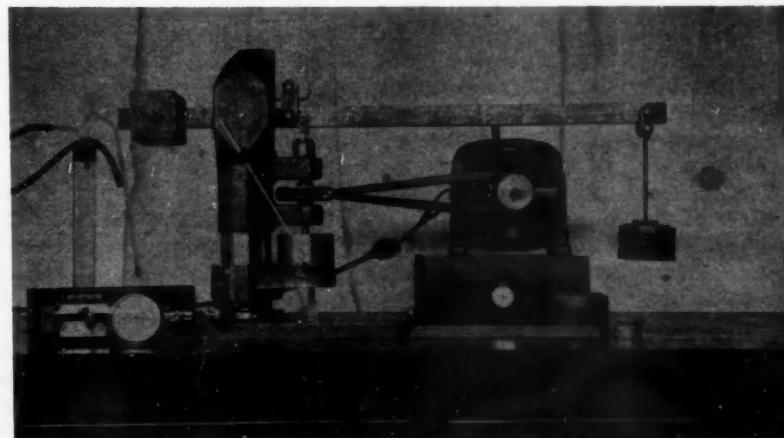
The enclosed photograph will give the reader a general idea of the machine, which under test has given check results on the same lubricant, rating the different lubricants of the same viscosity according to the difference in pounds per square inch which their oil films will carry. For testing, this machine uses thrust bearings which are submerged in the lubricant and which are hol-

lowed so that the lubricant is circulated through their interiors. These bearings can be repolished for another test in from 10 to 30 minutes, depending on the type of bearing metal used.

The load-carrying capacity of the lubricant under test varies greatly with the different bearing materials. If a manufacturer claims any certain ability, as penetration, adhesion, or absorption for his lubricant, on certain kinds of bearing surfaces, it can be readily shown by this machine, for the bearings can be made of the desired material on any good lathe in a short time.

This short description is being sent you with the idea that some of the readers of *Automotive Industries* might be interested in offering constructive criticism of my machine.

JOHN S. PHELPS,  
Mechanical Engineer.



Machine for testing oiliness developed and described in the Phelps letter

# British Test Supercharged Diesels for Air Service

**D**EVELOPMENT work on Diesel engines will be continued by the (British) Aeronautical Research Committee, according to a report recently issued by that committee. With carburetor engines it probably will not be possible to decrease the specific fuel consumption materially below 0.5 lb. per hp.-hr., and with this consumption and engines weighing only about 1.5 lb. per hp., for long journeys the fuel load on taking off weighs much more than the engine. With Diesel engines the great problem, of course, is to bring the weight down to a figure comparing favorably with that of the carburetor engine.

The latest plan of the Research Committee is to build a two-stroke engine of the supercharging type and to install it for experiment and study in the plant of Ricardo & Co. Earlier attempts to supercharge high-speed Diesel engines appear to have proved unsuccessful, owing to difficulty in securing sufficiently rapid combustion. Recently, however, an increase of 49 per cent in output has been obtained with an increase of 50 per cent in the inlet pressure, which indicates that there is practically no loss in combustion efficiency due to supercharging. It was found, however, that with all compression ratios an increase in the charging pressure narrows the range within which satisfactory operation is possible.

Various anti-knocks have been tried in compression-ignition engines, and of these ethyl nitrate proved the most satisfactory, but the effect is not very pronounced in engines with a high degree of turbulence.

Reference is made to the high degree of perfection reached by the carburetor-type of aircraft engine. In special cases an output of more than 1 hp. has been obtained per pound of engine weight, and the time is said to be approaching when reliable engines will be available that will develop 1 hp. for every 1½ lb. of engine weight in long runs. These remarkable output figures have been attained without any serious sacrifice with re-

**49 per cent increase in output obtained in recent experiments with 50 per cent increase of inlet pressure**

spect to the factor of safety. Indeed, the period between overhauls is now set mainly by deposits of sludge and carbon, and by sticking of the piston rings. For this reason a subcommittee has been appointed to study possible improvements in lubricating oils. Torsional vibration of crankshafts continues to give some trouble, but breakages are rare. Perhaps the least satisfactory feature of the modern aircraft engine is its high relative fuel consumption. Stock engines burn their own weight in fuel in about four hours, while the Schneider Cup engine succeeded in doing this in two hours.

One of the obstacles to an improvement in the fuel consumption is the apparent impossibility of achieving uniform mixture distribution. Multiple-cylinder engines fail to equal the results obtained from single-cylinder experimental engines in block tests by about 15 per cent. As an instance of particularly high fuel economy for a carburetor engine it is mentioned that a Jupiter VIII engine in a 100-hr. run showed a specific fuel consumption of 0.482 lb. of standard aviation gasoline per brake horsepower per hour when developing 396 hp. at 3000 r.p.m. To achieve this fuel economy a lean mixture was used, and inspection of the engine after the test did not show any injurious effects due to this mixture, although it appeared that the seats of the exhaust valves were beginning to deteriorate.

The British air service also has considered the possibility of solving the distribution problem by injecting fuel mechanically directly into the cylinders. Fuel consumption is usually materially higher in actual flight than in dynamometer tests, owing to the fact that the pilot has to adjust the fuel mixture by hand. In one squadron flight in

which no special precautions were taken to minimize fuel consumption, it was found that the consumption of some machines was as much as 40 per cent more than that of others under the same conditions. It would appear from this that a considerable saving on fuel might be effected if it were found possible to control the mixture automatically.

There appears to be a disposition to return to water cooling or evaporative cooling, owing to the great drag of air-cooled engines. Even when the air-cooled engine is fitted with a Townsend ring (cowlings) its drag is said to be about 15 per cent greater than that of an equivalent water-cooled engine, and in some cases the fitting of the ring increases the temperature of the engine. Some experiments have been carried out with high-boiling-point cooling fluids and it has been found that with a jacket temperature of 300 deg. F. the size of the radiator may be halved.

A theory has been propounded by Dr. A. A. Griffiths to the effect that at a speed of 350 m.p.h. the efficiency of cooling surface is greatly reduced, owing to compression and consequent heating of the air with which these surfaces come in contact. Dr. Griffiths estimates that the effect of the heating of the air by compression is to reduce the maximum speed by about 50 m.p.h. of what would otherwise be possible, and the correctness of this estimate is to be tested by measuring the surface temperatures of propeller blades.

Further study is being devoted to the problem of reducing drag, and there is believed to be a better chance of cutting down the drag by 20 per cent than of reducing the fuel consumption of the engine in a like proportion.

The third of a series of articles dealing with some of the fundamentals underlying the development of automatic speed changing devices satisfactorily to meet the conflicting and changing requirements of ordinary driving.

by P. M. Heldt

Engineering Editor,  
Automotive Industries

# AUTOMATIC TRANSMISSIONS

**T**HE third factor which may be used to control the gear ratio is the car speed. It is obvious that as the car speed increases the gear ratio must decrease, for no great road speed can be attained in the conventional first gear, which is a high ratio.

The available ratios need cover only a certain limited range, and there is no advantage in having a transmission in which the ratio can be made practically infinite, as in certain hydraulic and variable-throw transmissions. With a ratio that is too small the engine cannot handle the load properly and is likely to stall on the least provocation, while with a ratio that is too large there is more torque available at the rear axle (with the engine under full throttle) than the rear wheels can absorb, hence there is likely to be slipping of the wheels, which is injurious to the tires. The way passenger cars are being powered at present, the maximum useful transmission ratio seems to be about 15 to 1, while the minimum useful ratio is probably in the neighborhood of 3 to 1. With this latter ratio the average engine would still have a fair reserve of power and would not be easily stalled.

In trying to control the gear ratio in accordance with car speed, we are confronted with a difficulty to which reference was made in connection with the use of engine torque as the controlling factor, viz., when the car is at a standstill there is no car speed and no change in ratio can be effected by it. Ordinarily, in starting the conventional car, the first thing we do is

## An analysis of the possibilities of using car speed to control gear ratio changes

to disengage the clutch and shift into first gear. This is made necessary by the fact that for cranking the engine the latter must be disconnected from the drive while at a standstill.

The difficulty can be overcome by the use of a clutch which becomes disengaged automatically as soon as the engine speed drops below a certain point. The clutch evidently may be actuated either by centrifugal weights or by the intake-manifold vacuum. The transmission is then in low gear when the car is at rest, and as soon as the engine is brought up to a certain speed by pressing down on the accelerator pedal, the friction clutch picks up the load and the car begins to accelerate.

Changes of gear ratio can be effected by changes in car speed only through the use of a governor. Either a centrifugal or an hydraulic governor may be used, of course. The simplest case is again that of a two-speed gear with an overrunning clutch in one member of the low-speed drive. In that case a second friction clutch would have to be combined with the gear on the main drive shaft which would normally be disengaged but would be engaged by the speed governor as soon as the car had attained a certain speed. This clutch would lock the clutch-shaft pinion and the main drive gear together and then

produce a direct drive, which would be made possible by the over-running clutch in the gear meshing with the clutch-shaft drive pinion.

One difficulty probably would be that of getting a friction clutch of sufficient size between the pinion and gear, because its outside diameter would be limited by the center distance between the main shaft and countershaft. This problem probably could be solved by using a multiple disk clutch, for as the number of disks increases the necessary diameter for transmitting a certain torque decreases.

A centrifugal clutch has some disadvantages in this connection, because the speed of the driven gear, to which it must be connected, is necessarily low, and the centrifugal masses must be made relatively heavy to make a certain force available for gear changing. A more advantageous type of governor would seem to be a gear pump forcing oil through an orifice, so that the pressure on the oil would increase with the speed of the driven gear. The oil pressure would act on a piston which would be held in balance by a spring. In this case the spring would disengage the clutch and the oil pressure would engage it. A further advantage of this arrangement over a centrifugal governor would be that it would be comparatively simple to provide hand control in addition to the au-

tomatic control. All that would be necessary would be to have a valve in the orifice through which the oil moved by the pump is discharged. For any given speed of the car—and, therefore, of the main drive gear—the pressure of the oil naturally would be greater the smaller the orifice.

#### Limited to Definite Car-Speed Range

Without an auxiliary hand control, each of the two gear ratios available would be limited to a certain range in car speeds. There is quite a difference in this respect between controlling the gear ratio by the engine speed and by the car speed. In the case of engine-speed control only the lower part of the useful speed range of the engine can be used with the low gear, say up to 1500 r.p.m. or about one-half of the maximum speed. If the car were geared to run 60 m.p.h. at 3000 r.p.m. in high gear and the low gear were 2 to 1, then it could be run up to 15 m.p.h. in low gear, and all acceleration beyond that speed would have to be accomplished in high gear.

In the case of car-speed control, on the other hand, the speed range of the car could be divided in halves and the car accelerated up to 30 m.p.h. in low gear and the automatic gear-change mechanism set to effect the changeover to high gear at that speed. This means that the car would be accelerated in low gear until the engine attained its normal speed, which would evidently be impossible if the gear change were controlled by engine speed, since in that case a certain range of engine speed would have to be reserved for high-gear operation.

With gear control by car speed arranged as described in the foregoing, the car would be driven through the low gear at all speeds up to 30 m.p.h. and through the high gear at speeds beyond this. This would be entirely satisfactory from the standpoint of acceleration, but from another standpoint it would be quite unsatisfactory, in that practically all city driving would be done in low gear. It seems obvious, therefore, that in addition to the automatic control of the transmission ratio some form of manual control modifying the action of the automatic device must be provided. In controlling gear changes by hand exclusively we use practically the full range of engine speed with each of the different gears. For the highest car speeds we must necessarily use the high

gear (or small ratio) and if traffic conditions force us to slow down, we usually stay in this gear as long as we can. For acceleration up to maximum speed in the shortest possible time we must remain in low gear until the engine is practically up to its maximum speed, and as acceleration in this gear starts as soon as the automatic clutch takes hold, it must be possible to use the low gear throughout the range of engine speed.

This additional control would change the point of change-over from low to high gear and could be in the form of a lever on the steering wheel similar to the spark and throttle control levers. The effect of moving this lever on its quadrant would be to change the position of the spring rest of the governor spring in the case of a centrifugal governor, or the position of the control valve in the case of a hydraulic governor. Such a lever would have none of the characteristics of the conventional gear shift lever, in that its motion would be absolutely smooth and its operation would require no special skill nor any appreciable muscular effort. If such a manual control de-

vice were given a sufficiently wide range, each gear could be used at any engine speed desired.

It was pointed out in the foregoing that when one is forced to slow down by traffic conditions one usually remains in high gear as long as possible and changes gear only when the engine begins to labor. An automatic transmission evidently should keep the car in high gear also until the speed of the engine becomes too low for steady running. On the other hand, when one is ascending a rather steep grade one does not stay in high gear until the engine is practically at the point where it no longer is able to pull the car; for if that were done the car might stall during the interval the torque is interrupted, or at least slow down to such a speed that the corresponding engine speed in the next lower gear is within the range of unsteady operation, so that the engine would be stalled. This makes it plain that some form of manual control is needed in addition to the automatic control if the car is to be as flexible and as adaptable to various driving conditions as the modern car with manually-operated gear shift.

## Automotive Uses of Beryllium Bronze

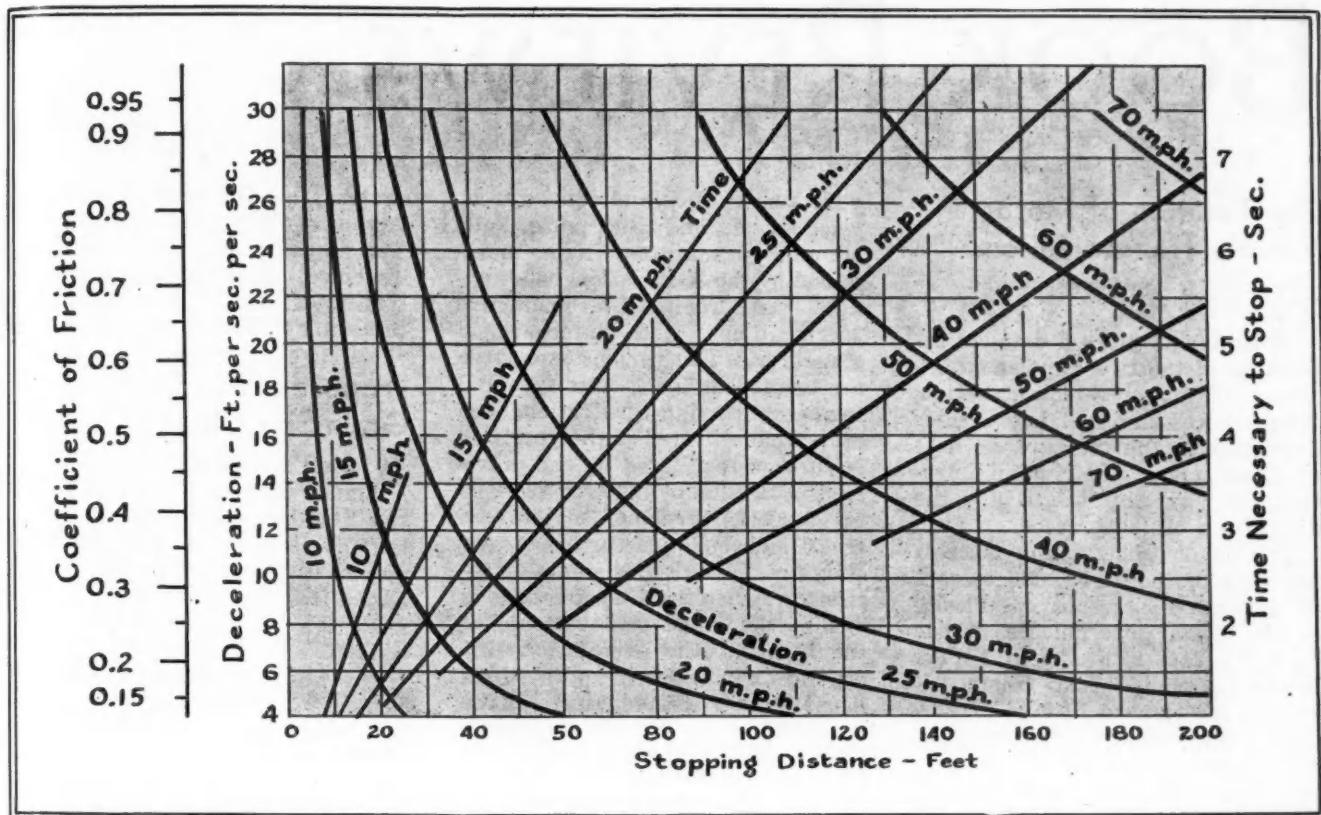
SOME applications of beryllium bronze in the automotive industries were mentioned at a recent meeting of the Hartford (Conn.) Chapter of the American Society for Steel Treating. H. J. Noble, assistant metallurgist of the Pratt & Whitney Aircraft Co., mentioned that a copper alloy containing 2.50 per cent of Be. is being used for the sleeve bearings of a Hamilton adjustable pitch propeller, in which the blades are adjustable through an angle of 6 deg. The castings act as bearings, which are capable of sustaining the very high pressure involved. Another aircraft company was said to use this alloy for valve guides, on account of its resistance to heat and abrasion. The Ford Motor Company was reported to be using the alloy for breaker points.

Castings of beryllium-copper containing about 2.50 per cent Be. are purchased in the "as cast" condition from a foundry specializing

in non-ferrous castings. Unusual strength and hardness are obtained by heat treatment. The usual heat treatment consists in annealing at 1450-1500 deg. F. and quenching in cold water. The alloy is then subjected to a precipitation hardening treatment. The physical properties obtained vary with the temperature of the heat treatment (500-600 deg. F.). It is possible to obtain tensile strengths of up to 180,000 lb. per sq. in. and a Brinell hardness of up to 400 by this treatment.

A master alloy containing about 12.5 per cent of beryllium is made by the Beryllium Products Corp. of New York, and there is also a German product on the American market. The 12.5 per cent alloy is introduced into the molten copper to produce the 2.5 per cent beryllium-copper alloy.

There is also a beryllium-nickel-copper alloy now on the market which contains 12.5 per cent of nickel.



## Stopping Distance Problems Solved Without a Pencil

THE accompanying stopping-distance chart, which was worked out by Norman M. Wickstrand of Meriden, Conn., makes it possible to solve stopping-distance problems without resorting to more or less intricate calculations. It is based on the use of four-wheel brakes and on the application of the brakes practically to the locking point. Effects of air resistance and of variation of the friction coefficient between tire and road with speed are neglected.

The chart shows the relations between coefficient of friction, deceleration, vehicle speed, stopping distance and stopping time. With brakes on all four wheels of a four-wheeled vehicle the entire weight is available for traction or retardation, and the deceleration then is directly proportional to the coefficient of friction, as indicated by the double scale on the left-hand side. It may be seen, for instance,

that with a friction coefficient of 0.7 the deceleration is slightly more than 22 ft. per second per second.

To find the distance required to stop a car from a speed of, say 40 m.p.h. if the friction coefficient between tire and road is 0.7, locate the 0.7 point on the friction-coefficient scale on the left, proceed horizontally to the right to the intersection with the hyperbolic curve marked 40 miles, and then vertically down to the horizontal scale, where the answer may be read off—77 ft. If now it is desired to find the time required to make the stop, proceed vertically up from the 77-ft. mark on the bottom scale to the intersection with the inclined line marked 40 miles, and from there horizontally to the right, where the right-hand scale gives the answer as 2½ seconds. The chart, of course, can be used also in the inverse way, that is, having given the initial speed and the stopping distance, we

can find the corresponding deceleration and coefficient of friction, and having given the initial speed and the stopping time, we can find the stopping distance.

### Nickel Plating Holds Its Own

NICKEL plating requires about 5 per cent of the total nickel that is being produced and the proportion has not been changed materially by the introduction of chromium plating, since every chromium-plated object has a coating of nickel underneath the chromium, of considerably greater thickness. Development work has been done during the past year on nickel plating baths at high temperature and of low pH, and in France a single sulphate bath has been developed which is operated at high current densities and with a conveyor to further reduce costs.

# BOOK REVIEWS

## The Taxation of Motor Vehicle Transportation

Price \$2.50. National Industrial Conference Board, 247 Park Ave., New York, N. Y.

This volume gives a detailed exposition of the two complementary forms of motor vehicle taxation, license taxes and fuel taxes, their development, the measure or base of these taxes, their administration, the financial results, and the disposition of the proceeds.

The results should be of interest not only to the 20,000,000 owners of motor vehicles, but specifically to the State governments, whose road program is promoted by the largest possible yield from this source, the manufacturers of automotive equipment, who desire good roads extended as far as possible but fear that high taxation may limit the sale of their products, and the railroads, seeking an equalization of competitive conditions.

## Monograph on Screw-Locks

Another volume of the series on special technical subjects which is being prepared with the cooperation of the German Patent Office has just been published by Carl Heymann's Verlag, Berlin, viz., Schraubensicherungen (Screw Locking Means), by Dr.-Ing. Hugo Schoeneich. The monograph discusses the subject of locking means for screws and nuts in a general way in about 30 pages and then devoted about 100 pages to brief illustrated descriptions of patented locking means. This particular section of the German Patent Office has about 4000 patent specifications issued by different countries, and several hundred of the devices patented are illustrated. The series is specially intended to aid applicants for patents and attorneys.

## Yearbook of the Tire and Rim Assoc.

The Yearbook of the Tire and Rim Association, Inc., for 1933, has made its appearance. It contains the experimental practices, recommended practices and standards of the Association. The Association, it may be pointed out, is made up of manufacturers of tires, rims,

wire wheels, disk and steel wheels, wood wheels, and allied parts. Four standing committees are maintained by the Association, on standards, membership, Government tire specifications, and international standards. The various standards are printed in large, clear type and the accompanying illustrations also are excellent. Use of the yearbook is further facilitated by the provision of a thumb index to sections on tractor, airplane, motorcycle, truck and bus and passenger-car standards, etc. Experimental practice for agricultural tractor tires is one of the latest achievements of the Tire and Rim Association, this practice having been approved on April 14 last. Headquarters of the Association are at 1401 Guarantee Title Building, Cleveland, Ohio.

## Nitriding of Steel

La Nitrazione dell'Acciaio (The Nitriding of Steel), by Dr. Frederico Giolitti. Published by Ulrico Hoepli, Milan, Italy.

A great deal has been written on various phases of the nitriding process since the first extensive account of the experimental work of Dr. Fry appeared in the *Kruppische Monatshefte* for September, 1923. Most of this material has been in the form of papers contributed to technical societies and articles in the technical press. The process has been in a state of rapid development and the subject therefore did not lend itself so well to treatment in book form. Now, however, the Italian metallurgist Giolitti, well known through a former work on the Heat Treatment of Low- and Medium-Carbon Steel for Mechanical Work, has produced a quite pretentious volume on the subject. It appears from Mr. Giolitti's book that considerable experimental work on the absorption of nitrogen by steel was done by various metallurgists previous to Fry, which latter is given credit by the author for having "undertaken a new vast series of researches on the nitriding of steel, guided by a sound and acute scientific spirit," and for having "drawn from the results of his experiments conclusions of the highest technical importance."

The book is divided into three

sections, headed respectively, The Action of Nitrogen on Steel, The Technique of Nitriding Steel, and Technical Applications of the Nitriding of Steel. Each section contains a number of chapters.

## Proposed Standard Grain-Size Chart

ANNOUNCEMENT has been made that the proposed Tentative Standard Grain-Size Chart for the classification of steels has been approved for publication by the Committee on Standards of the American Society for Testing Materials.

The need of grain-size determinations for S.A.E. and allied steels has been quite generally recognized. Many laboratories are making these tests, and as a result, different grain-size classifications are in use, with resulting confusion. The tentative standard is the result of laboratory experiments extending over a period of ten years and the proposed standard has been in the hands of the subcommittee for about two years. It was discussed at meetings, voted upon, and revised at different times; but, as now approved, it meets with the almost unanimous approval of the committee.

## Rubber and Automobiles

Rubber and Automobiles, by Colin Macbeth, with a Foreword by F. W. Lanchester. Published by the Rubber Growers' Association, London, England.

This is a well-illustrated book in loose-leaf form covering the various applications of rubber in the manufacture of automobiles. Considering its relative importance, the subject of rubber tires is dealt with very briefly in a chapter on Tyre Development. This application of rubber, of course, is long established and has a voluminous literature devoted to it. Other chapters deal with rubber in suspension systems, in chassis parts attached to the frame, in the powerplant, in transmission systems, in braking systems, in steering systems, in coachwork, body construction and seatings, and in the electrical system. Then there is a chapter on rubber latex in the automobile industry and another on rubber specifications and standards.

# Valve Control Mechanism

## Speeds Experimentation

A n ingenious mechanism whereby the lift, timing, and period of valve opening can be varied while the engine is running is being used in the experimental department of Armstrong-Siddeley Motors, Ltd., and the illustrations herewith are reproduced from our British contemporary, *The Autocar*.

The testing outfit really consists of three separate mechanisms. The first is used to vary the lift of the valve. A is the camshaft which operates lever B through a roller; the movement of B is transmitted to another rocking lever C through a sliding piece D, the arrangement of the axis pins for B and C on the same line as the slider D, and at the angle shown, being important. C lifts the valve through its push rod and rocking lever in the ordinary way, the inertia forces in the extra mechanism of the valve gear, being dealt with by an additional coil spring.

If the sliding piece D is removed to the right or left by means of the

hand control E, the amount which the valve lifts can be increased or reduced, E acting in a manner which increases or decreases the effective leverage of C.

But the moment at which the valve opens can be varied by a second mechanism in which the gear wheel F drives the camshaft A through intermediate pinions, of which four are shown in the sketch. The pinions are on shafts held in bearings by the circular piece G, which itself can be rotated by the worm H, controlled by a hand wheel. If G is rotated in one direction or the other, the cam is advanced or retarded, and the moment the valve opens it correspondingly alters.

Variation of the valve-opening period is effected by means of the third mechanism. The camshaft A terminates in a disk with a crank

pin, and the driving shaft K has a similar disk and crank pin, the two crank pins being inserted normally in the slot in the disk L, though, for the sake of clearness, they are shown disengaged in the sketch. L is kept in position by a ball race held by the lever M, which pivots about its bearing at N.

If the axes of K, A and L coincide, the camshaft runs at the same speed as K. If, however, L is moved to one side by swinging the lever M, the camshaft A no longer rotates at uniform speed, but turns fast for part of a revolution, and slowly for the remainder of that revolution. As a result, the cam can be caused to move very quickly 'round at the point where it will engage with the push rod, and the valve remains open for a shorter period.

This valve control mechanism was used to good advantage in the development of the Armstrong-Siddeley aircraft engine. It appears that it is built into a standard test base or crankcase on which single-cylinder test units can be mounted.

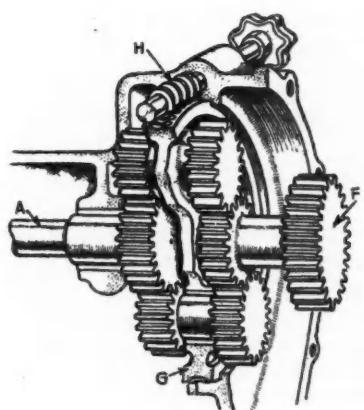


Fig. 1—Mechanism for changing the valve lift while the engine is running

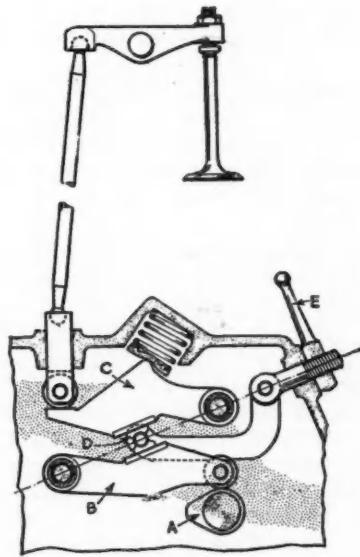


Fig. 2—By this mechanism the camshaft is advanced or retarded relative to the crankshaft

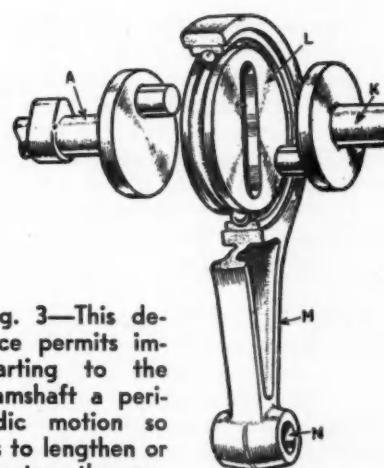


Fig. 3—This device permits imparting to the camshaft a periodic motion so as to lengthen or shorten the period of valve opening

## Lower Average Temperatures Make Diesels Easier to Cool

TO judge from discussions of papers on Diesel engines at recent meetings of engineering societies, the opinion seems to be current that theoretically these engines should operate at higher temperatures, and therefore give more trouble from overheating, than comparable gasoline engines.

It is well known that large Diesel engines, as used in stationary powerplants and in ship propulsion, present a difficult cooling problem. But this is due mainly to the large size of their cylinders, which sometimes have a bore of 4 ft. and over, and is aggravated by the fact that many of these engines operate on the two-stroke cycle and are double-acting besides, so that there is combustion in each cylinder during every stroke. At any given speed of revolution, a two-stroke, double-acting engine must dispose of practically four times as much waste heat as a conventional four-stroke, single-acting engine, so that the necessity for internal cooling of pistons in the former type need not occasion surprise.

However, the impression that Diesels of the conventional type designed for automotive purposes should present a more difficult cooling problem than comparable gasoline engines is probably founded on the consideration that the maximum pressure in such Diesel engines is much higher. When gases are compressed and expanded in an engine cylinder, pressure and temperature rise and drop together, and not only the maximum pressure but also the maximum temperature is higher in the Diesel engine. But it is the mean temperature of the cycle rather than the maximum which determines the amount of waste heat that has to be taken care of, and the difficulty of the cooling problem in general. Now, it can easily be shown that the amount of waste heat for a given power output is substantially lower in the Diesel engine, and that the average temperature of the Diesel cycle also is lower.

In the first place, many comparative tests have shown that the specific fuel consumption of a truck equipped with Diesel engine, on the weight basis, is little more than one-half that of a truck with gasoline engine. Now, fuel oil and gasoline have about the same heat value per pound, and the heat equivalent of

the work done in propelling similar trucks one mile naturally is the same whether the engine works on the Diesel or Otto cycle. Hence, since in the case of the Diesel only about half as much heat is liberated by the combustion of the fuel and the same amount of heat is turned into mechanical energy, there naturally is a much smaller balance of heat to go into the exhaust and the water jacket.

It is known that the exhaust temperature of the Diesel engine under specific load conditions is lower than the exhaust temperature of a gasoline engine under similar load conditions. Now, the exhaust temperature is lowered in case the conversion of heat energy into mechanical energy is more efficient, and this also lessens the amount of heat entering the jacket. If the combustion is delayed so that some of the fuel is burned relatively late during the stroke, it will tend to affect both the exhaust and the jacket losses in the same way, for if much heat is liberated during the latter part of the stroke, when the burning gases are exposed to a large wall area, the loss of the jacket is great, while at the same time there is little chance for heat liberated so late during the stroke to be converted into mechanical energy, consequently the exhaust also will be hotter. From this it appears safe to conclude that if the exhaust temperature and the exhaust losses are lower in a Diesel engine, the jacket losses also will be lower.

Looking at the subject in a different way, while the temperature in the engine cylinder at the beginning of the power stroke is un-

doubtedly much higher in the Diesel engine, the temperature also drops much more quickly in that engine. This is due principally to the more rapid rate of expansion in the Diesel. Let us take, for example, a cylinder of a total length of 6 in. Let the compression ratio be 14 to 1 in the Diesel and 5 to 1 in the gasoline engine. Then considering the compression chambers as extensions of the cylinder, the height of the compression space in the Diesel engine will be 0.4 in. and in the gasoline engine, 1 in. Consequently, in the Diesel engine the gases will be expanded to twice their original volume during the first 0.4 in. of piston motion, while in the gasoline engine it takes a piston travel of 1 in. to effect a similar expansion. Temperature drop of the gases, of course, is largely a matter of expansion.

It is obvious, moreover, from a comparison of Diesel and carburetor engine indicator cards that the pressure drop in the former is much more rapid during the early part of the expansion stroke, and consequently the temperature also must drop more rapidly. In this connection it is well to remember that during the early part of the expansion stroke, when the temperature in the cylinder is higher in the Diesel engine, the gases are exposed to a smaller area of cooling wall, than during the latter part of the stroke, when the temperature is highest in the gasoline engine, which gives increased weight, as it were, to the temperature excess in the gasoline engine.

The final result is that although at and near the beginning of the power stroke the temperature is higher in the Diesel engine, the average temperature of its cycle is lower, and hence the heat losses to the jacket are less in the Diesel.

—P. M. H.

## Will Rail Win Back Lost Traffic?

(Continued from page 92)

railcars the need for light equipment is particularly urgent, and designers find that some of the equipment which they must purchase from specialists, such as the switchboard for the electric drive, is not available in a type designed specially for lightness. Of course, once the demand for such equipment becomes sufficiently attractive, specially light equipment will be produced for the purpose, probably

with the entire supporting structure of stainless steel or light alloy, and insulating material used only in the form of bushings and washers. It is certainly advisable for all manufacturers of engines, engine accessories, electric drive elements and accessories to keep in mind that light construction is of far greater importance now than it ever has been in the past in the railroad field.

# The Steel Code Attitude Toward the Open Shop

**Sticks to traditional policy in 54 page document. Belief exists that NIRA administrators may ask modifications**

By L. W. Moffett

Washington Correspondent, Automotive Industries

THE steel industry has thrown down the gage of battle to organized labor.

Call it by whatever term one chooses, or deny it as one will, that is the distinct impression gained from the code of the American Iron and Steel Institute. The idea of sharp conflict between industry and labor is disturbing to officials at this critical economic period when the theme song centers about cooperation between government and business. It is aimed also to include cooperation between industry and labor. But steel has stuck persistently to its traditional open shop policy. And in its elaborate code of 54 printed pages, it most definitely enunciates that policy. Indeed it is the most clearly written feature of the entire code.

There are many who think that other industries well knew what steel proposed to do with regard to officially going on record for the open shop. These other industries are said to be stoutly supporting the policy and to be awaiting outcome of the inevitable attack that will be made upon it by organized labor when the steel code hearing gets under way. Already President Green has assailed the code for its open shop declaration, for its 40-hr. week plan and for its 40c. an hour as the top for common labor. The Green blast of course is only a mild prelude.

Bitterness will develop over the issue at the hearing. Steel is prepared to stand firmly as champion of the policy. It does not propose to retreat from organized labor's onslaught. The battle will not rage as fiercely as it would were the proceeding similar to a judicial or legislative investigation. No representative of a private interest favoring or opposing a code has any legal right to control or direct the presentation of evidence or procedure. This is subject to the sole control of the Deputy Administrator in charge. It is therefore purely an administrative procedure. There will be no "examination" and "cross-examination" of witnesses.

At that the issue between the open and the closed shop will be pointedly brought out, according to all indication. Lines to that end have been drawn. Moreover, the steel industry

will as a concomitant to the open shop vigorously support the company union. It did precisely this in its code.

Its declaration for the open shop and the company union is summarized below.

Doubt may well be cast on reports that the steel industry is prepared to withdraw its code if that principle is not approved. Rather it is the belief that the steel industry, and through it the motor and other industries are likewise prepared to go on record, proposes to serve notice that it will not submit to unionization.

For it is hardly probable that the National Industry Recovery Administration will allow itself to get tangled up with either the open shop or the closed shop. Therefore to expect it to "approve" the open shop principle appears to be beyond the mark. Equally true, it is beyond the mark to expect the N.I.R.A. to approve the closed shop. It can only accept the law as written. General Johnson says if the open shop principle qualifies the law it will be struck out. The law is held with increasing belief to favor organized labor. Whether that view is justly shared is beside the point so far as General Johnson and his administration are concerned.

The law requires insertion in the code of the clauses granting to employees the right of collective bargaining through representatives of their own choosing. Tied in with this clause is the declaration that em-

ployees shall have the right to refrain from joining a company union. These mandatory provisions are the cause of insistence on the part of many industrialists that they reflect organized labor's program. Certainly they have been made use of by organized labor. For organized labor has flooded industries with written and oral words that the law requires employees to join organized labor. It is only fair to add, however, that some industrialists have been equally as busy in advising employees that the law requires them to join company unions. General Johnson has assailed both kinds of propagandists. He has said the law is not a vehicle for either organized labor or the open shop.

The issue gathers force from day to day and that it will come to a head at the steel code hearing is the prediction of both open shop and closed shop advocates. The steel code therefore is being watched by coal, motor, and other interests as a possible model, so far as the open shop declaration is concerned. Similar wording perhaps will be followed in codes of these other interested industries. But from the point of the administration it perhaps will be only a formal declaration of policy with no legal significance, one that will neither violate the requirements for a code nor give it added force. For industry the situation is quite different because it will be a declaration of the right to conduct its own labor policy.

The steel code does carry a provision that the code may be terminated within 90 days. This perhaps has led some to the belief that the steel industry is prepared to withdraw the code if the open shop principle is not "approved." While the 90-day clause lacks clarity as to its significance, it is the general view that it means a new code may be submitted within 90 days if the original code were found unsatisfactory. The implication of complete withdrawal within 90 days and preparation to submit to consequent government action, however, is seen by many. There

(Turn to page 110 please)

## Open Shop Declaration in Steel Code

"The plants of the industry are open to capable workmen, without regard to their membership or non-membership in any labor organization. The industry firmly believes that the unqualified maintenance of that principle is in the interests of its employees.

"For many years the members of the industry have been and now are prepared to deal directly with the employees of such members collectively on all matters relating to their employment. The principles of collective bargaining under which certain members of the industry have dealt with their employees are embodied in employee representation plans, which are now in force at plants of members of the industry generally. It is the belief of the

industry that the method of collective bargaining set forth in such plans provides for a day-to-day adjustment of all matters relating to the employment of employees in the industry and at the same time insures to such employees a knowledge and understanding of the conditions of the business of their employer which they would otherwise be unable to obtain; that such principles should be maintained; and that the rights of the employees and members of the industry to bargain collectively through representatives elected or appointed and acting in accordance with such plans without interference, restraint or coercion of any sort should be preserved and protected."

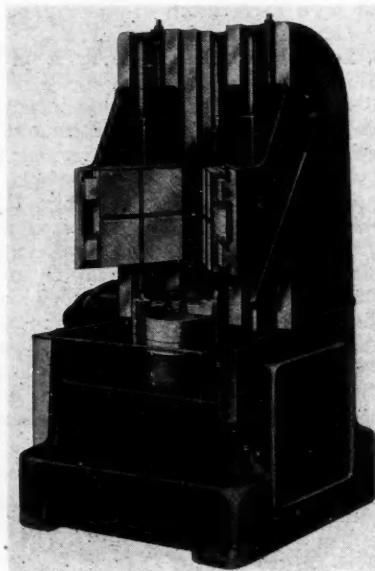
# NEW DEVELOPMENTS

## Automotive Parts, Accessories and Production Tools

### Flex-Au-Mobility With 80 Speeds

The first of a new line of machines based on Flex-Au-Mobiliay (Flexibility, Automaticity and Mobility) is the single-spindle, automatic vertical lathe, just brought out by The Bullard Co., Bridgeport, Conn. Because of its characteristics, it naturally falls into that class of equipment which functions efficiently either on the shorter runs or the higher production schedules.

The machine has been designed with three slides—two universal slides, each provided with swivel for angular cutting, and one plain vertical center slide, each of which is individually controlled by separate and independent feed works. These feed works are designed to give a total stroke of 20 in., and, for chucking



Bullard single spindle auto-matic vertical lathe

work, the universal slides have a downward and inward movement, while the center slide has only a vertical movement. The application of tailstock converts this machine into a center turning lathe, when the universal slides may be changed to obtain an inward, downward, outward, and upward movement. Rapid traverse for these three individual heads

is obtained through an independent motor, electrically interlocked, permitting the use of one motor for the selective traverse of any individual head.

The tooling of the heads has been given serious study, and is considered a continued item of flexibility. Simple standard tool holders are designed with extreme rigidity. These are easily and securely clamped to the slides and as easily rearranged for varying diameters, change in work design, or for changes requiring complete change-over or set-up.

Each of the three heads is provided with 80 independent feed changes obtained by means of change gears in their respective feed works, and there are also 80 speed changes for the table, with a maximum of 800 r.p.m. In addition, there is a two-way clutch, automatically controlled during the cycle of the machine so that spindle speeds may be changed at a ratio of three to one, or a ratio of one to three from the basic spindle speeds. This arrangement allows of slowing down or speeding up during the cycle of the machine to accommodate such work as sweeping, reaming, tapping, or threading at slower speeds or "finishing" at higher speeds.

The rugged spindle, Timken-bearing mounted, supports the nominal size 12-in., 3-jaw chuck, which has a maximum diameter of 14 in., and is in addition arranged with an inbuilt adjustable mechanical power chuck operator with foot treadle.

Electric control is completely automatic during the cycle of the machine, but may be controlled independently by push buttons from the operating position. The main drive motor is 20 hp., 1800 r.p.m., and is direct connected as is the 3-hp., 1800-r.p.m. rapid traverse motor; while an independent  $\frac{1}{2}$ -hp., 1800-r.p.m. motor drives the pump for the lubricating system.

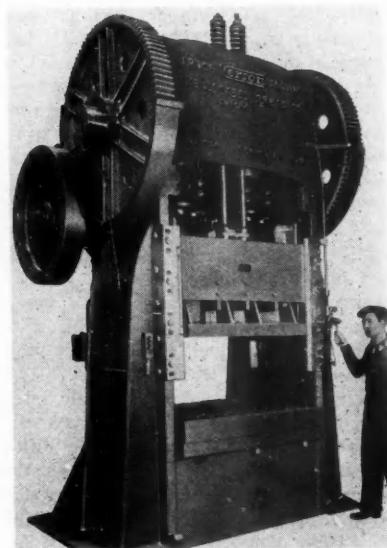
The capacity of the Bullard single-spindle automatic vertical lathe is 10 in. in diameter by 32 in. in height cutting with cross slides, and 10 in. in diameter by 36 in. in height cutting with center slides. However, there is a possible 18 in. diameter by 17 $\frac{1}{2}$  in. in height swing in clear.

The compactness and ruggedness of this machine will be noted in the projected floor space of only 57 in. by 67 in. with a weight of approximately 11,000 lb. without motors.

### Solid Frames for Press Line

The No. 956 Verson press of 350-ton capacity, illustrated, is typical of the new line of double crank presses with solid steel frames added by The Allsteel Press Co., Inc., Chicago, Ill. This line is built in a wide range of sizes and capacities.

The presses are of welded steel plate construction, light in weight, and require no pit. The friction clutch and brake are air operated and are mounted between the housing together with the motor and drive. Power is delivered evenly through



This Verson press has a capacity of 350 tons

two balance wheels, one on each end of the high-speed backshaft, which runs in roller bearings. The steel gibs and gibways are faced with renewable bronze liners.

The press illustrated is of 350 tons capacity with 9-in. shaft, 42 in. x 56 in. bed area, 16-in. shut height, 8-in. stroke, 6-in. adjustment and makes 20 strokes per minute. It occupies a floor space of 68 in. x 98 in. It is powered by a 20 hp., 1200 r.p.m. motor with push-button control, while a 1 hp., 1800 r.p.m. motor and reversing switch operate the ram adjustment.

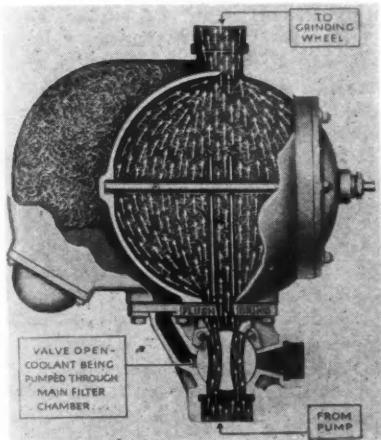
### Filter Cleans Cutting Fluid

In the interest of finer finishes for automotive parts production, the Fostoria Pressed Steel Corp., Fostoria,

# NEW DEVELOPMENTS

## Automotive Parts, Accessories and Production Tools

Ohio, has brought out a filter for cleaning the cutting fluid of production machinery such as grinders, screw machines, automatic lathes, etc. In normal operation, illustrated, the coolant is forced through the globe containing a special, non-metallic filtering material which is said to thoroughly separate all particles of grit, abrasive, and metal chips.



Fostoria filter for cutting fluids

Flushing the main filtering element is accomplished by turning the valve from "grind" to "flush" which directs the coolant through the by-pass element at the left back to the main filter chamber and out through a drain pipe to the receiving tank. At the same time a wrench placed on the end of a shaft extending through the main chamber is moved back and forth, compressing and agitating the filtering material by means of long rods placed at right angles on the shaft. A small sump cover receives the settling from this passage, and when this cover is removed, the filtering material also can be taken out and cleansed when necessary.

### Casting Machines Cut Costs

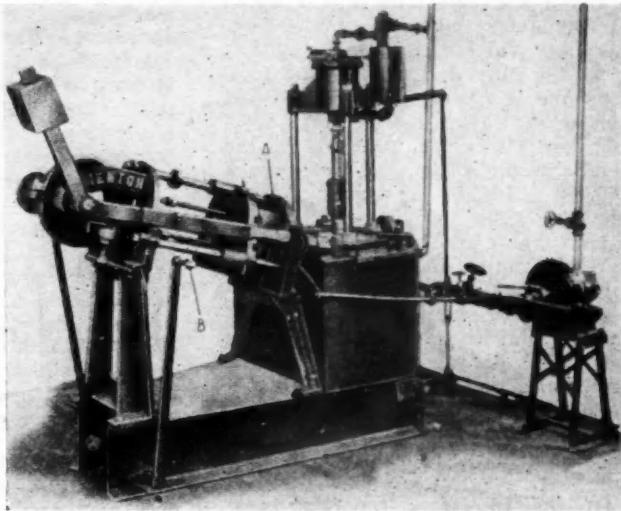
Newton - New Haven Co., New Haven, Conn., has recently introduced three types of die-casting machines designed and priced to compete with the common practice of using gated-patterns and sand castings for non-ferrous alloys. The machines are said to be particularly advantageous for

short runs of widely diversified castings. They are equally effective for continuous operation when thousands of duplicate castings are required.

One of the die casters is hand operated; another is semi-automatic; the third is full-automatic. On both the hand and semi-automatic types there

is returned by a spring which at the same time operates the air valves to raise the injector plunger to self-loading position. Casting speed is thus limited only to the speed of the operator and can run as high as 400 to 500 shots an hour on short runs or 600 to 700 shots an hour on continuous pro-

Semi-automatic casting machine of the Newton-New Haven line



are but two levers used when machines are in operation; on the full-automatic there is only one. The semi-automatic machine, illustrated, shows the two controls. Lever A is raised or lowered to open or shut the die, lever B is moved to the left to make a "shot,"

duction runs. With the hand machine, production rates are somewhat lower and with the full-automatic the rates are considerably higher. Multiple impression dies boost the number of pieces per hour in direct proportion to the number of impressions.

### Spray Coating Speeded Up

Large, flat products now can be spray-finished at an average rate of 200 sq. ft. per minute through the Transverse Spray-Coating Machine recently developed by the DeVilbiss Co., Toledo, Ohio.

In operation, the spray gun or battery of guns move across the material as it passes under the machine. The operation is similar to a hand-operated spray gun, except that a more uniform coating at a much greater speed is secured. Hence it is said to effect

drastic reductions in coating costs, and at the same time maintain quality.

The machine is mounted on a structural steel frame built to fit over a conveyor or other equipment used to carry the work through the spray machine. It may be adapted to equipment already in use or can be furnished with conveying equipment, spray booth, exhaust fan, spray guns, air and fluid regulators, material feed, etc., complete and ready to use. It is provided with ample adjustment for length of stroke, distance from work, type of finish, kinds of coating material, size of work and speed.

## June Sales Look Better In Revised Polk Estimate

**Trucks Sales Also Better  
and Perhaps 33 1/3%  
Ahead of June Last Year**

**DETROIT**—Exceeding materially earlier estimates, June sales of new passenger automobiles are expected to reach 166,000 units, was announced today in the national weekly motor car sales report issued by R. L. Polk & Co.

The estimate was based upon reports of registrations in 18 states. These showed a total of 47,748 units, which was 6.51 per cent greater than the 44,831 units registered in those states in May and 11.80 per cent greater than the 42,709 units registered in the same states in June last year.

If the final sales total for the month approximates today's estimate, sales for June will exceed both the 160,242 total for May and the 148,752 total for June last year. The Polk report last week, based upon reports from 102 key cities for 26 days of the month, predicted the total would reach 160,000 to 166,000, or a gain of 4 per cent over June, 1932.

New motor truck sales in June apparently ranged more than one-third greater than in June last year. Reports of registrations in 17 states showed total sales of 5886 units. This was 33.83 per cent more than the 4398 units registered in these states in the same month last year and 6.75 per cent greater than the 5514 units registered in the same states in May this year.

Of the 18 states reporting new passenger car sales totals, 11 showed totals greater than May. These were District of Columbia, Florida, Idaho, Maryland, Michigan, Minnesota, North Carolina, North Dakota, South Carolina, South Dakota and Wisconsin. At least five of these states are classed as agricultural. The states which reported sales under the totals for May were Connecticut, Delaware, Illinois, New Hampshire, Utah, Vermont and West Virginia.

### Permitte and Wilkening Join Forces in Canada

**TORONTO**—Permitte Products of Canada Limited and the Wilkening Mfg. Co. (Canada) Limited have joined forces, it is announced, and the sales of the two products will be handled from the new address, 43 Britain Street, Toronto.

### Timken R. B. Co. Gives Wage Increase

**CANTON, OHIO**—A general increase in wages, aggregating 11 per cent, effective July 1, in all departments has been announced by the Tim-

ken Roller Bearing Company. The announcement also said that the employment in the company's plant has increased from 1700 in March to approximately 4000 at the present time.

### Detroit Air Races July 28, 29 and 30

**DETROIT**—Detroit Air Races will be held at Wayne County Airport on July 28, 29 and 30, sponsored by the Board of Wayne County Road Commissioners and the Aircraft Bureau of the Board of Commerce. The program will be directed by the American Air Race Assoc.

The following committees have been named: Executive: William B. Mayo, chairman; Leroy C. Smith, John Carey, Commander H. B. Gow, Harry Shearer, secretary, and J. R. Ewing, manager. Advisory, Edward N. Hines, chairman; William B. Mayo, Leroy Smith, John Carey, Commander H. B. Gow, William B. Stout, J. Lee Barrett, Clyde M. Ford, Norman B.



Conger, Harvey Campbell, William A. Mara, Rex Humphries, N. A. Woodworth, W. B. Warner, Edward Macauley, L. E. Maples, John G. Haggerty, M. J. O'Brien, J. W. Schaeffer, C. V. Burnett and Harry Shearer, secretary.

Canadian, Capt. F. G. M. Sparks, chairman; Duncan McColl and Cyril Cooper.

## What Henry Ford Says About the National Recovery Act

**Credits Government with Good Intentions in  
Cooperating with Business. Laggards Will Suffer. More Wages and Spending Time Needed.**

**DETROIT**—Although Henry Ford does not agree with the Government in some of the measures which have been proposed for industrial rehabilitation, he is in no mood, according to Don Cameron of the Detroit Free Press, to criticize the National Industrial Recovery Act, from which he thinks that, on the whole, good results should be derived.

In the interview Mr. Ford said:

"So far everything has indicated that the Government is acting with good intention. Of course, there are a lot of surprises going around. We hear a lot about intended 'interference.' My position is that it will be time to deal with interference when it shows itself. So far as I have been able to see there has been nothing of that as yet."

"Of course, General Johnson will make mistakes—I think he would be the first man to admit that. But what he and the Administration want is not Government control of business; they want the best business principles of the best business men to become the rules of all business. That is reasonable."

"The men most likely to feel the sting of the act are the fellows who have lagged behind, the fellows who take their profits out of the workers' pay envelopes instead of earning them by their own brains."

### Urges "Modern" Wages

"The first thing needed is modern hours of work and a modern scale of wages. It is easy enough to raise wages if you make your customers pay for them. But, as I understand it, that will not be permitted."

"Prices have shot up even where wages and materials have not been affected, and that is not right. That is what put us

where we are. The Government wants to put wages up first and let prices follow naturally."

"There are some things proposed today that I can't believe in. I doubt if the Government believes in them either."

"For instance, I don't believe that you can create plenty by causing scarcity. I don't believe you can get very far making the good manufacturer pay for the backward manufacturer. We are not entirely ignorant of the basic principles of business, and I don't believe you can violate any of them without paying pretty heavily for it. You can't create a new set of principles as you can invent a new tax. These things are founded in nature."

### Auto Industry Pioneered

As to the effects on the Ford Co., Mr. Ford said:

"Our wages now are higher than any code is likely to set them. As to hours, it would seem that an eight-hour day and a five-day week is not excessive for an industry like ours. We pioneered in these two advances long ago, and we find that they work."

"We even did some planning for a six-hour day five years ago. But the time to make such improvements is when things are going well."

"I hope wages rise throughout the whole automobile industry. It will at least enable the employees of some shops to buy some of the cars they make. I always laid it down as a basic principle that the standard of wages in an industry should at the very least be such as would enable the workers to buy and use what they produce."

"Of course, in a productive country like ours, it is necessary that men should work as few hours as possible. And my reason for believing that is not the usual one. The real reason for more leisure in this country in busy times is that we may use and enjoy what we make. We can't go on producing all the time and never using."

# WS

## July Passenger Sales Will Top Last Year by Approximately 75%

For the Last Six Months Domestic Passenger Sales Estimates Vary Due to Conservatism. High Placed at 750,000

By Athel F. Denham  
Field Editor, Automotive Industries

**DETROIT**—Indications at present are that July domestic passenger car sales, although below June, will exceed last July by approximately 75 per cent according to factory reports from dealers. Total automobile and truck production still appears to be headed for beyond the 200,000 mark for the third successive month.

Estimates as to domestic passenger car sales for the last six months of this year now vary from around 350,000 to 750,000, indicating that executives are still inclined to be cautious. The agricultural situation complicates the outlook for the last half. While prices are better, crops are much smaller and little information seems to be available as to how many farmers and in what amounts are carrying over stocks of crops from last year.

Further indications that automobile company management remains conservative is that but little is committed for today in raw materials or parts for more than 30 days' needs ahead. Whether or not this situation may force price increases on cars during the fall is a moot question due to rising materials cost and impending wage increases. Manufacturers on the whole are not anxious to increase prices, at this time, at least not until new models are announced. Individual company reports follow:

Graham-Paige are more than 18 per cent ahead of last year's production for the second quarter. This year's figures are 3,560 against 3,004 for 1932.

Pierce-Arrow reports that they are

maintaining their increase in sales and production.

The combined sales of DeSoto and Plymouth by DeSoto dealers is reported as 3,058, a new all-time record and gain of 158.7 per cent over the corresponding week of last year.

On July 15 Chevrolet production so far this year had exceeded production for the entire year 1932. Present estimate for the entire year is 500,000 cars, 75 per cent of which will have been produced by August 1.

Chrysler sales reports retail deliveries of Plymouth and Chrysler cars 171 per cent of same week last year. Chrysler cars alone showed an increase of 119 per cent.

Sales of Plymouth cars for week ending July 15 are approximately 10 per cent ahead of week ending July 8 according to complete reports from Dodge and DeSoto dealers. Total sales for week should be in the neighborhood of 7,500 to 8,000. Production for July will probably be slightly under June, but preliminary orders indicate that August may be very close to July figures.

Hupmobile reports unfilled orders from dealers on July 17 as in excess of orders on hand April 17, the usual dealer buying peak. According to R. S. Cole, vice-president in charge of sales who has returned from a field survey, July sales will be well in excess of July last year with orders still increasing.

A meeting is being held here this week of all district and branch managers of Chrysler Sales Corporation.

### Willys-Overland to Make 5000 More Passenger Cars

#### Bondholders Committee to Study Financial and Present Operating Conditions. Reorganization Plan Offered

**TOLEDO**—Receivers for the Willys-Overland Co., were granted authority to manufacture 5000 additional passenger cars and the same number of additional trucks in orders signed Monday by Judge George P. Hahn in federal court.

At the same time the court held a hearing on the reorganization plan at which the formal approval of the preferred stockholders and creditors was given to the plan put forth by the reorganization committee, headed by W. B. Stratton, New York, but bondholders registered objection.

The bondholders committee agreed to send one or two representatives to Toledo to go over finances, present operations and all details to see if an agreement could later be worked out.

Judge Marsh of the bondholders committee said: "It appears to our committee that the plan as proposed

(Turn to page 110, please)

### Forty Hour Week Seems to Be the Aim of Automobile Industry

**DETROIT**—Indications that automobile manufacturers are actively aiming at the present time at a maximum employment week of not more than 40 hours pending submission and approval of a code is evidenced in an announcement made during the past week of increased employment at various factories.

Chevrolet with employment of better than 40,000 on July 8 is adding 7,000 men during the month and limiting working week to 37½ hours. Buick recently added another thousand to payrolls.

Wage increases have also been com-

ing through, with parts companies appearing in the lists. McCord Radiator recently announced a 5-10 per cent wage increase for its 1,200 employees.

Employment in the Chrysler Corp. is at a peak at present it is claimed. Fisher Body in Flint has added 350 this month.

That there is room for a considerable spread of employment is indicated by employment figures for June, released by the Michigan Department of Labor. Totals for June of 146,211, while 8½ per cent ahead of May, was still 17 per cent below June last year in spite of higher production rates.

Earnings per capita, however, had shown a rise to an average of \$26.56 compared with \$23.61 last June indicating largely longer working hours.

Announcement has been received here that Clarence E. Weiss, personnel director of Packard, has been appointed Michigan State Director of Reemployment under the United States Department of Labor.

#### Dow Chemical Pays Dividend

Dow Chemical Co. declared a quarterly dividend of 50 cents on the no-par stock and a quarterly dividend of 1½ per cent on the preferred, both payable Aug. 15 to stock of record Aug. 1.

## Business in Brief

**Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries**

Reports showing improvement in various lines of trade and industry continued to appear last week, and there were no signs of the usual summer let-down. Steel operations were maintained at a relatively high level; and the falling off in orders and specifications was attributed to the July 4th holiday. Lumber production was 82 per cent above that during the preceding week. Employment continued to improve here and there, and there were reports of further wage increases.

### Freight Loadings Hold Firm

Railway freight loadings during the week ended July 8 totaled 539,223 cars, which marks a reduction of 94,851 cars below those during the preceding week, due to the holiday, an increase of 123,295 cars above those a year ago, but a decrease of 223,221 cars below those two years ago.

### Power Production Still Up

Production of electricity by the electric light and power industry of the United States during the week ended July 8 showed an increase of 14.7 per cent above that a year ago.

### Construction Gaining

Construction contracts awarded in 37 eastern States during June, according to the F. W. Dodge Corporation, totaled \$103,255,100, as against \$113,075,000 a year ago. However, the June total was almost 34 per cent above that in the preceding month.

### Employment Advancing

New York State factory employment increased 4 per cent during the month ended June

15, while total payrolls increased 5.7 per cent. These upturns mark the third successive monthly advance.

### Cotton Consumption Bigger

Cotton consumed during June amounted to 777,940 bales, including linters, as against 698,993 bales during the preceding month and 369,481 bales a year ago.

### Fisher's Index

Professor Fisher's index of wholesale commodity prices during the week ended July 15 stood at 68.8, as against 66.6 the week before and 65.1 two weeks before.

### Stock Market Buoyant

The stock market last week continued its buoyancy, and prices spurted upward in a sensational manner. Some of the specialties rose with great rapidity. Trading was at a faster pace, and the volume of transactions on Thursday almost reached 7,500,000 shares. The grain markets also rose sharply on reports the current wheat crop is the smallest since 1893 and that the rye crop is in the poorest condition on record.

### Federal Reserve Statement

The consolidated statement of the Federal Reserve banks for the week ended July 12 showed decreases of \$14,000,000 in holdings of discounted bills and of \$10,000,000 in holdings of bills bought in the open market. Holdings of Government securities increased \$12,000,000. The reserve ratio on July 12 was 68.4 per cent, as against the same figure a week earlier and 68.8 per cent two weeks earlier.

### June Registrations Estimated at 172,000

PHILADELPHIA—June registrations of new passenger cars in the United States amounted to 172,000 against 149,000 a year ago and 160,000 in May of this year, according to estimates based on returns from 21 states. This represents an increase of about

16 per cent over June, 1932, and approximately 7 per cent increase over May of this year.

On the basis of these partial returns Chevrolet leads the field with 54,000, Ford second with 32,000 and Plymouth third with 31,000 units. As compared with June, 1932, Chevrolet indicates an increase of 46 per cent, Ford a decline of 39 per cent and Plymouth an increase of 87 per cent.

### Canada Now Has 25 Automobile Plants

Over 8000 Employees—\$1 Million in Wages Paid—  
28 Million of Materials Used

TORONTO—A compilation of statistics of the automotive industry in Canada reveals a total of 25 plants in which automobiles and trucks are manufactured, all but seven being located in the Province of Ontario. These factories are operated by 18 different companies having a total capitalization of \$49,641,777. During the past year an average of 8810 employees were engaged, their salaries and wages totalling \$11,435,741. The cost of materials at works totalled for the year \$28,278,809, while the selling value of the finished products at works was \$43,801,389, the value added by manufacture being \$15,522,580.

Of the 18 manufacturing companies operating in the Dominion 15 had parentage in the United States, while the origin of another was in the United Kingdom, this exception being Leyland Motors Limited, Toronto, producing commercial vehicles.

Canadian companies are listed as follows:

Chrysler Corp. of Canada Limited, Walkerville; Dominion Motors Limited, Leaside, Ont.; Federal Truck Company of Canada Limited, Windsor; Ford Motor Company of Canada Limited, East Windsor; General Motors of Canada Limited, Oshawa; Gotfredson Trucks Limited, Walkerville; Graham-Paige Motors of Canada Limited, Walkerville; Hayes Mfg. Company Limited, Vancouver; Hudson-Essex of Canada Limited, Tilbury; Hupp Motor Car Corp. Windsor; International Harvester Co. of Canada Limited, Chatham, Ont.; Leyland Motors Limited, Toronto; Packard Motor Car Company of Canada Ltd., Windsor; Stewart Truck Corporation of Canada Ltd., Fort Erie; Studebaker Corp. of Canada Limited, Walkerville; Vancouver Engineering Works, Vancouver; White Company Limited, Montreal, and Willis-Overland Limited, Toronto.

### Buick Motor Company Puts More Men to Work

FLINT, MICH.—Irving J. Reuter, president of the Buick Motor Company, says that more than 1000 former employees will be put back to work, as production on the company's present models will be continued until September 15. Production of new models began last year in July.

### Biggest June in History of USL

TOLEDO—USL battery sales in June this year were 24 per cent greater than any previous June in USL's history and sales in July are running 34 per cent ahead of June.

## Consider Rule Changes for Indianapolis Race

### Further Fuel Restrictions to Emphasize Streamlining

**DETROIT**—Adopted primarily as a potential means of slowing down somewhat the 1934 five hundred mile classic at Indianapolis, is a new rule which will limit the amount of fuel permitted each car for the entire grind. Just how many gallons will be permitted still remains to be determined by a committee appointed by Captain E. V. Rickenbacker of the Speedway Association. The committee consists of Lee Oldfield, Delmar G. (Barney) Roos, Chief Engineer of Studebaker; W. G. Wall, Consulting Engineer, Indianapolis; B. E. Sibley, Chief Technologist, Continental Oil Company, and T. E. ("Pop") Myers of the Speedway, Chairman.

What the new rule will probably do, however, is to produce considerable research before next year's race on the subject of streamlining by various entrants. It is entirely within the realms of possibility that streamlining will be a major factor in determining next year's winner, since fuel consumption per mile at a given speed depends mainly on the amount of wind resistance. A well streamlined car will be able to run the race at a higher speed without danger of running out of gas.

Another suggestion which had been offered in the hope that it would tend to slow down the race and thus prevent accidents, limiting carburetors to one for every four cylinders in fours, eights and sixteens, and one to every three in sixes, and twelves, was defeated at the race rule meeting to which had been invited representatives of interested parties in addition to the technical committee.

A suggestion that the present weight limitation rule be eliminated received considerable discussion, but finally lost on a roll call vote of those present.

Oil tank capacities which last year were fixed at 6 gal. were revised to 6½ gal. to conform with the decision made at Indianapolis just before the race to allow 2 qt. extra capacity for breathing space. This was a subject of bitter contention just before memorial day this year.

The 15 gal. gasoline tank capacity was retained at 15 gals. If as appears likely there will be a fuel consumption limitation of somewhere around 45 gal. for the race this would present a rather interesting problem as to how to run the race by individual drivers—whether to run slow enough to require only two pit stops for gasoline or whether to run faster and make one additional stop.

Use of obsolete and junk parts in race cars once more received attention at the meeting, Friday, resulting finally in the appointment of a committee consisting of Charles Merz, Lee Oldfield, Louis Schwitzer, and T. E.

Meyers to make clearer on the entry blank or some such means that cars may be disbarred if in the opinion of the technical committee they do not appear to be safe.

Another committee composed of three race drivers, Leon Duray, Harry Hartz and Dave Evans, with T. E. Meyers as chairman was appointed to check up on new drivers at the race. This committee will require that new drivers acquire considerable experience on the Indianapolis track before being allowed to drive thereon in competition.

Stock cars as a possibility for Indianapolis to the exclusion of special race cars led off the discussion at the meeting with opinions about equally divided as to desirability. Since it was evident, however, that no action would be taken in any event for the 1934 race, the topic was dropped without coming to a vote.

Other requirements for the Indianapolis race remain unchanged from last year.

## Elgin Road Race to be Revived in August

Revival of the Elgin national automobile road race is announced for August 24 and 25. It will be held over the original eight-mile course near Elgin, Ill., under the sanction and rules of the American Automobile Association. The Elgin National Auto Road Race Association is the sponsoring organization.

Permission for the closing of adjacent roads on the days scheduled has been granted by Governor Horner and the state highway department, owners of property abutting the speed route have signed releases for the use of the right-of-way, rules and regulations governing the two days of contests are being threshed out and other preliminary details have been arranged so all that practically remains is the car entries and the signatures of the competing drivers.

The Elgin race was an American classic and occupied a prominent place on the national sports calendar from 1910 to 1920. The revival is listed as a sports feature of *A Century of Progress*.

Cooperating also are the Chicago Automobile Trade Association, the officials of the Indianapolis Motor Speedway and the Elgin National Watch Company, which will time the races with their newly developed electric timing device. J. E. Duffield has been named as general manager.

## Caterpillar Tractor Company Report for June

**PEORIA, ILL.**—Current losses as reported for the month of June are less than for the preceding month, June showing a net loss of \$17,176 and May \$61,809. Net sales in June amounted to \$961,306.

## Small Cars Rule European Markets

### Expert Sees Revival of Demand for U. S. Trucks and Cars in the Future

**WASHINGTON**—The depression has emphasized the predominance of demand in Europe for small automobiles with low horsepower ratings on which taxation is fixed.

This was pointed out to *Automotive Industries* by H. C. Schuette, who, until dismissed recently along with other American trade representatives for the Department of Commerce, was assistant automotive trade commissioner to Europe with headquarters in Paris.

Mr. Schuette estimates that at least 75 per cent of the automobile sales in France are made up of cars with fiscal horsepower ratings of 8 hp. or less. The same condition was said to be more or less true in Germany and England. It was stated that only one American car in France comes within that class, the small European Ford.

It is the opinion of Mr. Schuette that when conditions improve the possibility of selling American cars in Europe will be as great as it has ever been, especially trucks. The ratio of trucks to passenger cars in Europe was declared to be much higher than it is in the United States.

There is not a single automotive trade commissioner left in Europe as the result of the shakeup in the Department of Commerce economy drive. Some of the work is being done by commercial attachés or other representatives abroad of the department. But cultivation of markets abroad for American motor vehicles, parts and accessories will be much less intense than it was. There also will be a great drop in the number of reports from abroad about foreign markets for the trade. European representatives of American automobile companies are said to feel that closing of the office of the automotive trade commissioner will be a blow to them.

## Blackall President of Taft-Peirce Co.

**WOONSOCKET, R. I.**—Frederick S. Blackall, Jr., has been elected president and treasurer of the Taft-Peirce Mfg. Co., makers of precision tools and special machinery. He will continue as general manager.

Other newly elected officers are John W. Wheeler, Jr., of Bridgeport, Conn., vice-president, and Wm. A. Gordon, 3rd, of Pittsburgh, secretary.

Mr. Blackall has been associated with Taft-Peirce since 1922, acting successively as foreman and metallurgist, branch office sales manager, assistant to the vice-president, assistant manager, and vice-president and general manager.

## Willys-Overland to Make 5000 More Passenger Cars

(Continued from page 107)

is premature" and he indicated his group would be willing to perfect a plan.

He said the bondholders felt they were asked to sacrifice too much, they desired no cut in the face amount of their bonds, they want to know whether \$2,500,000 is sufficient working capital to carry on, if there is assurance that amount can be raised, and what changes in management are contemplated.

Attorneys for the National City Bank of New York, trustee, under the bond indenture, filed a motion for leave to file a bill of foreclosure and also a motion to consolidate that action with the receivership.

Judge Hahn said he believed there was no hostility in that move and would take the matter under advisement.

Attorneys for the reorganization committee will file a brief to make clear their attitude on the foreclosure bill. It was felt, however, that the sale may be a required part of the reorganization details.

Walter F. Brown, attorney for the receivers, said he was convinced after

attendance at most of the conferences between attorneys that both sides are acting in good faith to save the Willys-Overland property as a going unit in Toledo.

Another factor in the hearing was the withdrawal by the receivers of an application for authority to sell certain machinery, tools and dies to the International Harvester Co. Equipment used in the making of the half-ton model D-1 trucks was covered in this application. No explanation was made of the reason for the application or its withdrawal.

The plant here is now making 100 passenger cars and 100 trucks daily and plans are being developed to increase this schedule to 250 units of each daily by Aug. 1. Additional authority granted the receivers will enable them to operate nearly to the end of the year. There are now 2600 workers on the payrolls and this number will be stepped up to 3300 by Aug. 1, it was reported.

National City Bank of New York petition for Bill of Foreclosure as trustee under Willys-Overland mortgage. Attorneys will agree upon an order consolidating with receivership and naming same receivers.

Receiver L. A. Miller announced payment of balance of personal property tax of \$107,000 on Thursday complying with a federal court order.

## Steel Attitude Toward Open Shop

(Continued from page 103)

are at least some leaders in the steel industry who believe such an attitude would be a serious mistake.

In any event, steel's challenge to organized labor and its clearly-recorded championship of the open shop has excited deep interest because it is held to set up a charter for other industries to adopt.

### Fundamental Principles of Employee Representation Plans Set Forth in Steel Code

The fundamental principles of Employee Representation Plans in the Industry are substantially as follows:

1. There shall not be any discrimination against any employee because of race, sex or creed, or any impairment of or any interference with any right of such employee to belong to or not to belong to any lawful society, fraternity, union or other organization.

2. Employees shall have the right to hold elections of their representatives at least once in each calendar year.

3. In order to avoid intimidation from any source whatsoever, nominations of candidates for election shall be made by secret ballot and elections from among candidates so nominated shall also be by secret ballot. Such nominations and elections shall be held on the premises of the employer where the employees participating therein are employed at times and places in each case convenient for such employees and after ample notice thereof to them.

4. The candidates nominated and the representatives elected shall be chosen from among the employees who shall not participate in the management of the business of their employer. The representatives so chosen shall be sufficient in number and from among the employees in the different types of labor, so that

each such type shall be fairly represented. 5. Duly elected representatives of the employees shall have the right to hold their meetings without the attendance thereof of any representative of the management of their employer.

6. Procedure shall be maintained whereby duly elected representatives of the employees may confer jointly with one or more representatives of their employer at regular intervals, to the end that such representatives shall have full opportunity for fair and unhampered discussion with such representative or representatives of such employer of any topic of mutual interest.

7. In case the duly constituted representatives of the employees or committees of such representatives shall be unable to agree with the duly constituted representatives of their employer upon any question relating to hours of labor, rates of pay and other conditions of employment, procedure for appeal shall be maintained, if necessary, to the head of such employer (in the case of a corporation, to its chief executive officer) responsible (in case the employer shall be a corporation, under its board of directors) for the management of the business of such employer, with a view to a final decision that shall be just and fair as between the parties interested.

8. Such plans shall be so operated as to insure to such representatives of the employees full protection in the conscientious representation of their constituents.

### McCord Radiator Reports Increased Sales

DETROIT—McCord Radiator & Mfg. Co. has reported shipments amounting to \$533,000 during the month of June as compared with \$461,874 for May and \$267,035 for June, 1932. The volume for the second quarter of the year exceeded that of any previous quarter since 1930.

## Steel Code Makes Prices Uncertain

### Producers Willing to Absorb Cost Jumps But Price Revisions are Imminent

NEW YORK—The perfectly natural reaction of steel consumers to the code which the steel producers have submitted to the Industrial Recovery Administration has been speculation as to the extent to which increased costs as the result of higher wage scales may be passed on to them. Recent advances in flat rolled steel prices served to distract attention from the fact that there has been no change in the prices of heavy rolled steel products, bars, plates and shapes, since March 1, 1932. Steel bars are still quoted at the lowest price since the post-war slump. Automotive consumption of steel bars, probably half of it in the form of alloy steels, constitutes approximately 30 per cent of the total sales. The burden of increased wage scales is certain to weigh heavier on a relatively low-price tonnage product, such as steel bars, than on the more highly finished products of sheet and strip mills. Semi-finished steel, such as sheet bars and billets, is also still quoted at the same prices that prevailed throughout the depression and these are the lowest in 15 years. Non-integrated mills that depend upon others for their supply of semi-finished steel, while covered for their current requirements, also face the possibility, if not probability, of higher prices for their fourth-quarter material needs. The general impression in the steel market is that while producers will be able and willing to absorb whatever increase in costs results from the higher code scale of wages during the current quarter, upward revision of the price structure for the fourth quarter must be definitely reckoned with. There is much talk of the rate at which steel has been bought of late having been much higher than that at which it is being worked up. This certainly is not true of automotive buying. As fast as automotive consumers received shipments from the steel mills, the material was formed and assembled. Reserve accumulations of steel in automotive hands are virtually nonexistent.

**Pig Iron**—Following announcement of a \$1 per ton advance in pig iron prices for a third quarter shipment in all markets, blast furnace interests intimated that melters must look for another rise in the cost of fourth-quarter iron. Scrap prices have also advanced all along the line.

**Aluminum**—Secondary aluminum prices rule firm, remelters asking slightly higher prices on small lots. The virgin metal market is unchanged.

**Copper**—Domestic stocks were whittled down to the extent of 37,000 tons last month. The market has settled down to a firm 9c. basis. Earlier reopening of the Phelps Dodge smelter at Douglas than planned when it was shut down will bring the copper industry back to about 20 per cent of rated capacity, twice what it was in March.

## N.A.D.A. Organizing Executive Council

ST. LOUIS, MO.—Many acceptances have already been received by President Vesper of the N.A.D.A., as a result of a letter sent out to executives of state sectional and local automobile dealers associations in which he said, "An Executive Advisory Council has been formed at N.A.D.A. headquarters whose membership will include managers, secretaries and other administrative executives of automobile trade associations throughout America."

After a short time the organization of this council will be completed by the election of officers of this division of the N.A.D.A. which will be consulted regarding the services that can be advantageously rendered, information that can be exchanged and a program built up of benefit to the executive group.

Among those who have already accepted are the following:

Herbert Buckman ...Cleveland, Ohio  
Lafayette Markle .....Chicago, Ill.  
C. E. Holgate .....Newark, N. J.  
H. A. Scott .....Coshcocton, Ohio  
H. T. Poore .....Knoxville, Tenn.  
C. R. Barnett .....Kansas City, Mo.  
Tom Braden .....Denver, Colo.  
L. L. Austin .....Atlanta, Ga.  
C. B. Richardson, Haddonfield, N. J.  
R. J. LaPorte .....Holyoke, Mass.  
Roy Bernard .....Wilmington, Ohio  
Harry A. Fox .....Utica, N. Y.  
James G. Miller .....Cumberland, Md.  
Harry G. Bragg .....New York City  
Walter Ferrell .....Des Moines, Iowa  
W. H. Heylman .....Spokane, Wash.  
Geo. Stem .....New Orleans, La.  
W. N. Owings .....Pittsburgh, Pa.  
A. N. Benson .....Minneapolis, Minn.  
G. E. Walker .....Pueblo, Colo.  
P. N. Hevgold .....Duluth, Minn.  
A. D'Ettel .....San Francisco, Calif.  
A. L. Danforth .....Boston, Mass.  
F. A. Hinchcliffe .....Boston, Mass.  
W. A. Williamson, San Antonio, Tex.  
L. R. Lasher .....Schenectady, N. Y.  
J. K. Gordon .....Tacoma, Wash.  
Willis Hake .....Fostoria, Ohio  
Jay O. Leveille .....Duluth, Minn.  
Cass Kennedy .....Oakland, Calif.

## Stutz Motors Gets More Working Capital

INDIANAPOLIS—The Stutz Motor Company of America, Inc., has sold approximately 40,000 shares of common stock to New York banking interests to provide inventory capital for the production of Pak-age cars, E. S. Gorrell, president, announced. An additional block of approximately 10,000 shares was used to meet claims of bond holders of a 1922 issue of \$1,000,000 which provides for the trade of 33 shares of common stock for each bond. The total issue as filed with the Federal Trade Commission is 50,228 shares at \$5 per share par value. Of this \$1,000,000 bond issue,

Gorrell asserted, \$681,000 has been retired leaving a balance of \$319,000. Most of this retirement has been made in the last few depression years, he said. With several orders for large fleets nearing the closing point, production of the light commercial Pakage cars is expected to be stimulated considerably with the procurement of capital.

## Alexander Churchward

S. ORANGE, N. J.—A heart attack caused the death of Alexander Churchward, well-known electrical engineer and former associate of Henry Ford and Thomas A. Edison. For many years he took an active interest in the Society of Automotive Engineers. For the last twelve years Mr. Churchward was technical director of the Wilson Welding and Metal Co. of N. Bergen. There are more than 200 patents in the automotive, radio and telegraphy fields in his name.

## Graham-Paige Shows Profit in First Half

DETROIT—The Graham-Paige Motors Co. and subsidiaries reporting for the six months ending June 30 show a net profit, after deductions for interest, taxes, depreciation and other charges, of \$23,627 which is equal to \$1.57 per share on 15,000 7 per cent preferred shares. This showing compares with a net loss of \$249,797 last year.

## R. F. C. Improves Banking in Detroit

DETROIT—By voting to make \$75,000,000 available toward a settlement of Detroit's banking difficulties by the Reconstruction Finance Corp. and the subscription of the Fords and others to a \$5,000,000 fund for the organization of a new banking company, something more than a ray of sunshine and a touch of optimism was contributed to the banking situation in this city. There seems to be justification now for the belief that some definite move will soon be made which will release funds tied up in closed banks.

## Spencer Manufacturing Adds More Men

CANTON, OHIO—Another increase in the number of employees at the plant of the Spencer Manufacturing Co., at Spencer, has been announced.

## Crude Oil Production Gains Continue

NEW YORK—The American Petroleum Institute estimates that the daily average gross crude oil production

for the week ended July 15, 1933, was 2,633,150 barrels. Daily production for the four weeks ended July 15 averaged 2,586,250 barrels.

Cracked gasoline production by companies owning 95.1 per cent of the potential charging capacity of all cracking units, averaged 503,000 barrels daily during the week.

## Nash Declares 25 Per Cent Dividend

KENOSHA, WIS.—The directors of the Nash Motor Company have declared a dividend of 25 cents per share which is payable on Aug. 1 to stockholders of record, July 20.

The report for the second quarter shows that the company holds cash and government securities to the amount of \$31,800,265.22. This compares with \$31,503,668.44 for the first quarter.

## Michigan Registrations Show Increase

DETROIT—Michigan new car registrations during June totaled 12,491—an increase of approximately 10 per cent over June last year and six per cent over May this year. Ford again led with 3837, Chevrolet second on list with 3105, Plymouth third with 1598, Dodge fourth with 1025 and Pontiac fifth with 828.

## Hudson Motor Increases Wages

DETROIT—Announcement is made by Roy D. Chapin, president of the Hudson Motor Car Co., of increases in wages of from 5 to 10 per cent for 5000 of the Company's 7000 employees. This amounts, on a yearly basis, to an increased payroll of more than \$750,000.

## Chevrolet In Toledo Adds More Workers

TOLEDO—Chevrolet Motor Ohio Co. here has added 500 men to payroll, bringing total to 2200. Plant is on five day week of 7½ hours a day. Another employment boost is expected by August 1.

## Motor Wheel Gives 10% Wage Increase

LANSING, MICH.—Harry F. Harper, president and general manager of Motor Wheel Corp., has announced a general 10 per cent wage increase affecting 1800 employees. Shipments for June were reported as the largest since May, 1929.

## DuPont Gets Decision in Lacquer Patent Case

**U. S. Circuit Court of Appeals Reverses Opinion of N. Y. District Court**

NEW YORK—A decision of great importance to the nitrocellulose lacquer industry was handed down by the United States Circuit Court of Appeals for the Second Circuit on Tuesday of last week, when it reversed the decision of the District Court for the Eastern District of New York in the case of E. I. duPont de Nemours & Company vs. The Glidden Company. In the patent infringement suit brought by E. I. duPont de Nemours & Company, the District Court had held invalid, for non-invention, claims 2, 3, 6, 8, 9, 12 and 17 of Patent No. 1,629,999 issued to Edmund M. Flaherty on May 24, 1927, and reissued on November 29, 1927 (No. 16,803). Infringement was conceded, but the judge held all of the claims mentioned invalid for lack of invention.

After going, at some length, into the details of the case, which concerns the invention of a nitrocellulose lacquer marketed under the trade name Viscolac, explaining that the practicability of cellulose-base lacquer depends to a large extent upon its viscosity and that various processes were known long before the date of this invention by which the viscosity of nitrocellulose could be reduced, the Court of Appeals in its opinion goes on to state that the patent "gave a recipe for reducing viscosity and for oils or resins, but laid no claim to it or any part of it. It claimed no more than that to produce an effective lacquer of thick coating quality the viscosity characteristic of the nitrocellulose must be below a critical limit fixed in the claims."

The question naturally arises whether this constituted invention, and on this point the opinion has the following to say:

"An invention must be judged by what was in the public demesne, as well as in the inventor's favor, as against him. Nor was there any new discovery in softeners to account for success, as we have already said. True, all that Flaherty did was to carry out what was already known, and by trial and error fix the limit which should be observed. If genius is demanded, surely he was no inventor; rather he was one of those who, taking the knowledge at hand, worked out its implications in the laboratory."

After having pointed out that upon the appearance of the patented lacquer under its trade name Viscolac, the art very generally followed suit, and after having cited numerous references, the opinion continues:

"Therefore, we are disposed to regard Flaherty's work in this case as invention. From him dated, in fact, a contribution whose value cannot be denied; to him must be attributed the

first practicable low-viscosity lacquers, whose desirability had been known long enough to make them the subject of much experiment; we can discover nothing but the control of viscosity which achieved success; obvious as that may now seem, that information turned out to be enough to direct the art."

### Senate to Investigate Alcohol as Auto Fuel

WASHINGTON—Chairman Harrison of the Senate Finance Committee announced the appointment of a sub-committee to study the practicability of using alcohol made from farm products as motor fuel. The sub-committee will be headed by Senator Clark of Missouri. Other members are Connally and Gore of Oklahoma, Democrats, and LaFollette, Wisconsin, and Walcott, Connecticut, Republicans.

This sub-committee will begin hearings in November and is expected to report at the next regular session of Congress in general.

### W. Acheson Smith

NIAGARA FALLS, N. Y.—W. Acheson Smith, who died last week, was president of the Acheson Graphite Co. and a vice-president of the National Carbon Co. His death occurred in the Johns Hopkins Hospital in Baltimore after a brief illness. Mr. Smith was responsible for many developments in the use of graphite as a lubricant.

## Rubber Consumption Reaches All Time High

Consumption of crude rubber by manufacturers in the United States for the month of June amounted to 51,326 long tons, which is the highest consumption figure on record. This compares with 44,580 long tons for May this year, and represents an increase of 15.1 per cent over May and 23.8 per cent over June a year ago, according to statistics released by The Rubber Manufacturers Association today. Consumption for June, 1932, was reported to be 41,475 long tons. Consumption for first six months, 1933, amounted to 184,724 long tons as compared with 190,924 long tons for same period, 1932.

This organization reports imports of crude rubber for June to be 22,729 long tons, a decrease of 17.5 per cent under May and 45.1 per cent below June, 1932.

The association estimates total domestic stocks of crude rubber on hand, June 30, at 333,954 long tons, which compares with May 31 stocks of 364,623 long tons. June stocks show a decrease of 8.4 per cent as compared with May of this year, and were slightly lower than June, 1932.

The participants in the statistical compilation report 63,608 long tons of crude rubber afloat for the United States ports on June 30 compared with 43,342 long tons afloat on May 31 this year, and 43,079 long tons afloat on June 30, 1932.

June reclaimed rubber consumption is estimated to be 9,674 long tons, production 10,591 long tons.

## "Committee on Organization" Calls Meeting of Parts Mfrs.

**Super-Association Suggested in Letter Setting July 24 Gathering**

CHICAGO—A large list of manufacturers of automotive equipment and replacement parts, accessories, shop equipment, service tools and chemical products has been circularized by the "Committee on Organization Under the National Industrial Recovery Act" of manufacturers of the products mentioned.

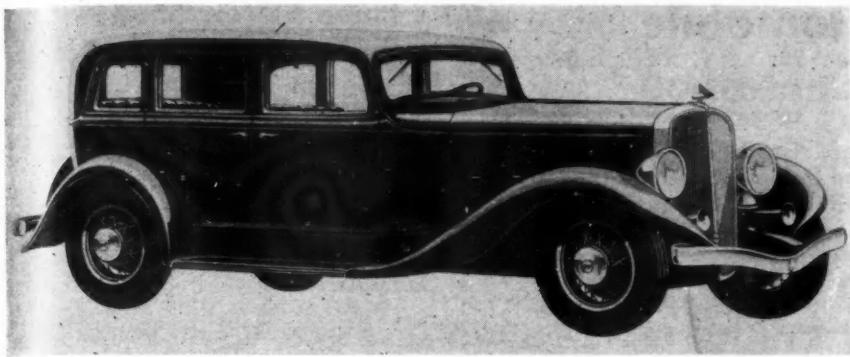
The committee requests attendance at a meeting of manufacturers in these lines to be held at the Book-Cadillac Hotel in Detroit on Monday, July 24th. The purpose of the meeting, as set forth in the circular, is to consider setting up a trade organization which will broadly represent manufacturers in this part of the automotive industry and to represent and act for them in their relations with the Federal administration under the National Industrial Recovery Act.

Reports will be submitted to the meeting based on the committee's

studies and contact with Washington during the past five weeks, regarding, so the circular states, "the type and form of organization which appears most likely to be satisfactory to the administration and best fitted to carry on the necessary work under the requirements of the Recovery Act."

The committee asserts that the proposed form of association is in no way competitive with existing trade associations within the automotive industry. Those who signed a letter after a preliminary meeting held in Detroit recently were the following. All of them are the presidents of the companies they represent.

Claire L. Barnes, Houdaille-Hershey Corp.; Vincent Bendix, Bendix Aviation Corp.; C. S. Davis, Borg-Warner Corp.; H. F. Harper, Motor Wheel Corp.; A. C. McCord, McCord Radiator & Mfg. Co.; C. D. Minninger, Electric Auto-Lite Co.; C. E. Thompson, Thompson Products, Inc.



The free-wheeling unit is enclosed in the transmission of the new Franklin series

## Improvements Made In Austin Bantam Car

BUTLER, PA.—Improvements both in chassis and body have been made in the Bantam line of the American Austin Car Company.

In the engine, the valve springs have been redesigned, higher compression is used, the ratio being 5.65 to 1; the front end has been redesigned in accordance with American practice; there is now a three-point adjustable V-built drive for the pump and generator.

In the new piston assembly all rings are now above the piston pin to provide ample lubrication of the skirt and pin. One oil control ring is used. A cam, giving more ramp for quieter operation, has been adopted. The clutch throwout has been improved to give greater life by eliminating the continuous running feature. The steering gear is heavier and now has a ratio of 9.5 to 1 instead of 6.6 to 1. The steering tie-rod has been strengthened and the wheel camber reduced to give longer life to front tires.

The torque tube ball housing assembly has been equipped with springs on the bolts to prevent breakage in tightening and to take up wear.

Changes have been made in other details to increase attractiveness of appearance and serviceability.

## Illinois Judge Says No To Gas Tax Diversion

CHICAGO—According to a permanent injunction granted by Circuit Judge L. E. Stone of Sangamon County, revenues from gasoline taxes in Illinois can be used only for road improvement.

Despite wide protests gas tax funds were being used by many Illinois counties for unemployment relief. The decision of Judge Stone is regarded as holding the diversion of these funds as unconstitutional. This is the second decision against the diversion of gasoline taxes. In Minnesota the attorney general recently

ruled that gas tax allotments to counties cannot be diverted.

The ruling against diversion in Illinois will, in the opinion of county and state officials, greatly accelerate road building.

## New Lines Added By Marmon-Herrington

INDIANAPOLIS—First sales of the new Marmon-Herrington line of all-wheel drive trucks have been made to the U. S. Army. The new line comprises in all 21 models and 48 types. The new model A series includes five models and 12 types ranging from 1½ to 4 tons capacity with prices of from \$2250 to \$5940 at the factory.

Three other 4 and 6 wheel drive series round out the new Marmon-Herrington line. These are the TH-4 Series with six 4-wheel drive models of 4½ to 9 tons. The TH-6 Series with four six-wheel drive models of 10 to 20 tons and the TH-D Series with six Diesel engine models of 7 to 20 tons.

## NACC Code Committee Reports Next Week

NEW YORK—As was announced in *Automotive Industries* last week the NACC Industrial Code subcommittee headed by Donaldson Brown of General Motors Corp. has been holding a series of meetings in Detroit, the last one being scheduled for Thursday of this week. It is expected that the committee will report to a meeting of the members of the N.A.C.C. on Tuesday, July 25th.

## Goodrich Added to Employment in June

AKRON, OHIO—It is announced by B. F. Goodrich & Co. that 1,643 workers were added to the payroll during the month of June. The number of those on the company's payroll on June 30th was 31 per cent greater than at the same time last year.

## Franklin Introduces New Olympic Series

Featured by Detail Body and Mechanical Changes—No Change in List Price

SYRACUSE, N. Y.—H. H. Franklin Manufacturing Company is introducing a new series of its Olympic model, in which a number of changes have been made. Prices remain the same, viz., \$1,385 for the sedan and coupe, and \$1,500 for the convertible coupe.

Front fenders are now provided with skirts of the type introduced on the Franklin 12, and running boards are wider, have a fuller sweep, and are covered by overall corrugated rubber mats. Front and rear bumpers and lamps have new styling, the lamps being "slenderized." A new instrument board promotes easy reading of instrument dials and contains two glove pockets. The controls now include an Electrolock which is used in connection with the Startix switch. Changes have been made also in the interior hardware and the arm rests.

The frame has been made more rigid by the provision of a central X member and by reinforcement by means of sectioned sills. From the rear engine supports steel channels extend all the way to the spring horns, making a box section out of the side rails. A cross member is gusseted to the frame rails at the front of the engine, a second at the rear of the transmission, and another at the extreme rear.

A rearrangement of the powerplant mounting has eliminated the overhang of the transmission. There are two direct-bolted supports on an arm of the frame in front, two rubber supports at the rear of the crankcase, and two additional ones at the rear of the transmission.

The free-wheeling unit is now enclosed in the transmission. A new kick shackle is provided for the left front spring and all other spring shackles are of the silent "U" type. Needle bearings are used in both universal joints, the design of the muffler has been improved with regard to back pressure, and the spare tire is now carried on a bracket riveted directly to the frame, independent of the front fender.

It was announced that since its introduction last fall the Olympic model had accounted for 80 per cent of all Franklin sales.

## Roper of Ray Day on Eastern Sales Trip

DETROIT—J. C. Roper, Jr., Director of Sales of the Ray Day Piston Corporation, is now making an extensive trip through his eastern sales territory. He will contact distributors, explaining Ray Day's new merchandising plans.

## N. A. C. C. Sees Automobile As Bulwark Against Depression

"Facts and Figures" for 1933 Gives Important Data on Relations of Industry to General Economic Situation

**NEW YORK**—In the 1933 edition of "Facts and Figures of the Automobile Industry" which has just been published by the National Automobile Chamber of Commerce, it is pointed out that American standards of living have been safeguarded from attacks of unfavorable business conditions by the automobile.

The automobile is revealed as a bulwark safeguarding American standards of living from the attacks of unfavorable business conditions in the 1933 edition of "Facts and Figures of the Automobile Industry," being released today by the National Automobile Chamber of Commerce. The book is a 96-page statistical summary of the manufacture.

As evidence of the unwillingness of American families and business concerns to dispense with their use of the highways, *Facts and Figures* discloses that the decline in the number of vehicles in operation and in the quantity of gasoline which they consumed during 1932 was only about 6 per cent—much less than the curtailment which occurred in the consumption of many other essential commodities.

Also of encouragement to the motor industry is the disclosure that at the beginning of the current year approximately 6,400,000 vehicles still in service were over six and one-half years old—the age at which their retirement from use and replacement by new vehicles would normally occur.

A digest of some of the information on the various subjects included in the booklet follows:

The industry maintained its position as one of the nation's largest manufacturing industries as measured by the value of finished products sold. Capital investment in car and truck factories alone amounted to \$1,489,900,000. Motor factories gave employment directly to 229,841 workers who received in salaries and wages \$282,929,203. The industry provided work directly and indirectly to 3,900,000 wage-earners.

The motor industry also continued to be the largest single consumer of such raw materials and commodities as steel, malleable iron, gasoline, rubber, plate glass, nickel, lead, mohair and upholstery leather.

Over 17 per cent of all steel produced during the year was used in the manufacture of motor vehicles and their accessories. The motor industry absorbed 77.6 per cent of the total output of alloy steel and 53.2 per cent of the total output of strip steel.

In addition, the industry consumed 80.4 per cent of the year's rubber out-

put, 43 per cent of the plate glass output, 53 per cent of the upholstery leather output, 33 per cent of the lead output, 28 per cent of the nickel output, 85 per cent of the gasoline output and 14 per cent of mohair.

The average useful life of motor vehicles increased during the year from 7 1/4 to 7 1/3 years, a study based upon production, sales and registration statistics disclosed. Of the total number of vehicles in operation at the close of 1932, 58 per cent were more than 4 1/2 years old, 46.6 per cent were more than 5 1/2 years old, 38.5 were more than 6 1/2 years old and 30.2 per cent were more than 7 1/2 years old.

It is estimated that highway users paid taxes at the rate of \$2,947,992 a day, or \$2,041 a minute. Collections of state registration fees and gasoline taxes alone last year amounted to \$34.70 per vehicle—an increase of 300 per cent since 1919.

Citing the National Safety Council as authority, reports that fatalities resulting from traffic accidents numbered 29,500—a reduction of more than 4000 deaths under the casualties for the preceding year. Trucks, buses and taxicabs were revealed as having contributed most substantially to this improvement in the accident record.

## CALENDAR OF COMING EVENTS

### SHOWS

Eastern States Exposition, Springfield, Mass.	Sept. 17-23
National Metal Exposition, Detroit	Oct. 2-6
Joint Trade Show, M.E.M.A., N.S.P.A., M.E.W.A.	Oct. 30-Nov. 4
New York Automobile Show,	Jan. 6-13, 1934
Chicago Automobile Show	Jan. 27-Feb. 3, 1933

### CONVENTIONS

Int. Assoc. of Show and Assoc. Managers, Chicago	July 24-25
Natl. Assoc. of Motor Bus Operators, Chicago	Sept. 21-22
National Metal Congress, Detroit	Oct. 2-6

### MEETINGS

S.A.E. International Automotive Engineering Congress, Chicago	Aug. 28-Sept. 4
American Chemical Society, Chicago	Sept. 11-15
American Transit Assoc., Chicago	Sept. 18-20
Natl. Safety Council, Chicago	Oct. 2-6
National Metal Congress, Detroit	Oct. 2-6
American Petroleum Institute, Annual, Chicago	Oct. 24-26

## Hupp Motors Shows Reduced Loss in First Half

**DETROIT**—For the six months ending June 30, after depreciation and other charges, the net loss of the Hupp Motor Car Corp. was \$781,432 compared with \$1,480,187 in 1932. For the second quarter this year the net loss with charges deducted was \$258,435 against \$522,997 in the preceding quarter and \$884,010 in the second quarter of 1932.

## L-O-F Earns \$2,000,000 in Six Months

**NEW YORK**—A net profit of \$2,157,083 after depreciation, interest and other charges was reported for the first six months by the Libbey-Owens-Ford Glass Co. This is equivalent to 89 cents a share and compares with a net profit of \$48,130 or 2 cents a share during the first half of 1932.

The net profit after deductions for the second quarter ending June 30, was \$1,533,980, as compared with \$623,103 for the corresponding quarter last year.

## Gabriel Shows Profit In Second Quarter

**CLEVELAND**—After charges for taxes, interest, depreciation, etc., a net loss of \$8,442 was shown by the Gabriel Co. for the first six months of 1933 as compared with \$49,261 in the first half of 1932.

For the second quarter a net profit after deductions of \$20,423 on Class A and Class B stock contrasted with a net loss of \$28,865 in the first quarter and \$5,796 loss in the second quarter of 1932.

## Goodyear to Establish Bank for Its Employees

**AKRON**—The Goodyear Tire & Rubber Co. will establish its own commercial bank for the use of employees of the company, President P. W. Litchfield announced this week. The new bank will be a state institution capitalized at \$300,000, and will be located in the Goodyear Building here. Date of opening has not been announced.

## Federal Sales Increase Four Successive Months

**DETROIT**—For the fourth successive month the sales of the Federal Motor Truck Co. for the month of June showed an increase over the preceding month. July shows every indication of hanging up still another new high record in sales.

# Here is the Steel for Gears today



FEW automobile parts require steel possessing the high combination of physical properties demanded for ring gears and pinions.

That is why Bethlehem focused every research and manufacturing facility on the development of Bethlehem Nickel-Molybdenum Gear Steel. The result is a gear steel that not only withstands the terrific stresses imposed by modern high-power motors, but behaves well under manufacturing operations.

Bethlehem Nickel-Molybdenum Gear Steel is of course made to the analysis and physical properties specified by the customer. But—beyond the range of specifications lie a number of characteristics that have a vital bearing on the performance of the steel.

Grain-size, for example. Some customers are now specifying it. But even when it is not specified, Bethlehem gives grain-size most careful consideration with a view to the intended service.

And tooth-strength. Bethlehem has devoted a vast amount of research to developing a steel of proper toughness, with the result that high tooth-strength is a salient feature of Bethlehem Nickel-Molybdenum Gear Steel.

Other important characteristics, to which the closest study is given, are: Freedom from warp, ability to take heat-treatment, and machinability or "gears per grind."

No wonder this remarkable gear steel is constantly winning new users! A large number of today's motor cars have ring gears and pinions made from Bethlehem Nickel-Molybdenum Gear Steel. Bethlehem Steel Company, General Offices: Bethlehem, Pa.



## BETHLEHEM *fine* ALLOY STEELS